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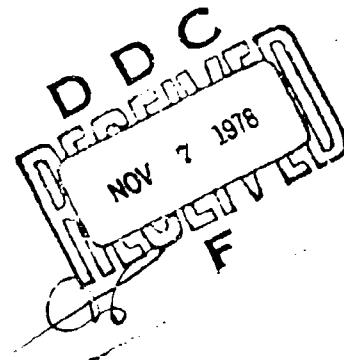
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## The Diagnostic Rhyme Test (DRT): An Air Force Implementation

STEVEN MEISTER, Capt, USAF

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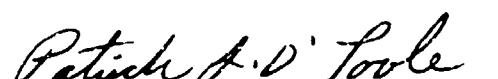
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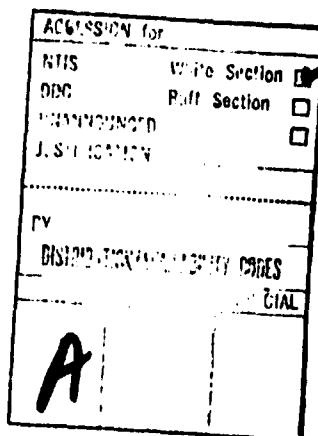
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## The Diagnostic Rhyme Test (DRT): An Air Force Implementation

### I. INTRODUCTION

The Diagnostic Rhyme Test (DRT)<sup>1</sup> for intelligibility was initially developed under Contract No. F19628-70-C-0182 for the Air Force Electronic Systems Division, Voice Processing Laboratory (formally part of the Air Force Cambridge Research Laboratories, Data Sciences Laboratory). In recent years the DRT has emerged as a DoD Standard for testing the intelligibility of voice communications terminals. This is evidenced by its extensive use by the DoD Narrowband Secure Voice Consortium during its FY75 and FY76 Test and Evaluation of candidate narrowband digital voice algorithms for use in the 1980's. The DRT's used by the Consortium were evaluated under contract by Dynastat, Inc., Austin, Texas, the developers of the test. This report documents the development of an in-house capability to administer and score the DRT.

(Received for publication 18 June 1978)

1. Volers, W. D., Sharpley, A. D., and Hehmsoth, C. J. (1973) Research on Diagnostic Evaluation of Speech Intelligibility, AFCLR-72-0894.

## 2. THE DIAGNOSTIC RHYME TEST

### 2.1 Introduction

The DRT is a test for intelligibility rather than user acceptance, or quality, of voice systems. Although related, it is important to note the distinction between intelligibility and quality. It is possible for a voice system to be perfectly intelligible yet have a very unnatural sound or not permit speaker recognition. In such a case the system is likely not to be acceptable to the user. On the other hand, a system having poor intelligibility will certainly be unacceptable to the user. Thus, a prerequisite for user acceptance is high intelligibility. The DRT is a measure of that characteristic of a voice system. The test is structured in such a way as to allow a detailed analysis of the ability of a system to reproduce certain classes of phonemes. These classes are categorized by the binary attributes VOICING, NASALITY, SUSTENTION, SIBILATION, GRAVENESS, and COMPACTNESS. The test provides a means of measuring the performance of the voice system for each state, present or absent, of these six attributes as well as total intelligibility. Using these results, specific weaknesses in the voice system can be pinpointed and corrected. This method of diagnostic analysis has been successfully used.<sup>2,3</sup>

### 2.2 Usage

A series of master tape recordings have been prepared by Dynastat, Inc. under various Government contracts to be used as input speech material for testing the intelligibility of the voice system under consideration. Each tape recording consists of one or more speakers uttering a known randomized sequence of words. Each word has been selected from a pair of rhyming words differing only in the leading consonant. Figure 1 presents the sequence of events for DRT usage. In order to conduct a DRT one or more master tape recordings are used as input speech material to the voice system under test. The processed output speech is tape recorded for later presentation to a crew of listeners for evaluation. The listeners' task is to determine which of the rhyming words had been uttered by the speaker. After all tape recordings processed by the system under test have been heard by the listening crew, computer analysis of the listeners' responses takes place and a comprehensive printout of the results is provided. Further analysis by the user can then take place.

- 
2. Smith, C. P. (1976) Comparative Evaluations of Speech Intelligibility Performance of Three Narrowband Voice Communications Methods: Trivoc, Linear Prediction Coding (LPC) and Piecewise Linear Prediction Coding (PLPC). ESD-TR-77-131.
  3. Smith, C. P. (1977) Intelligibility Performance of Narrowband Linear Predictive Vocoder in the Presence of Bit Errors. ESD-TR-77-328.

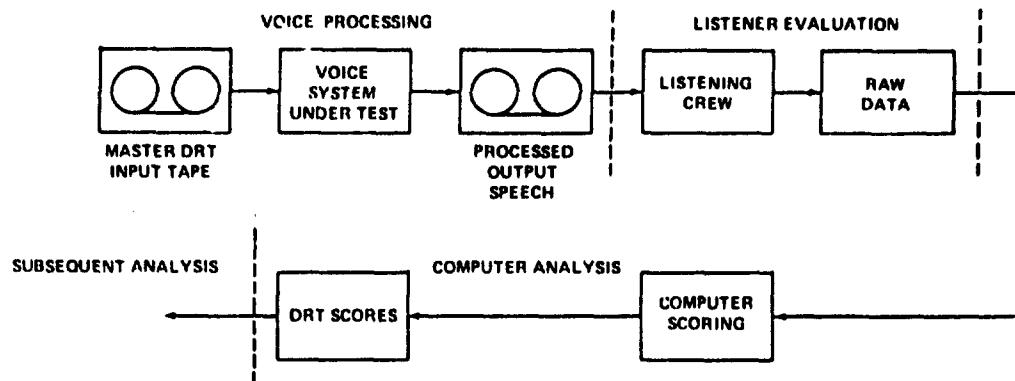


Figure 1. DRT Usage. The sequence of events

### 2.3 Structure of the DRT

A complete DRT consists of one speaker uttering 464 words of which 384 words are actually scored. The remainder are filler and experimental words. DRT's are normally administered in half tests (192 words) using multiple speakers. The complete list of words used in the DRT appear in Figures 2a through 2d. The DoD Narrowband Secure Voice Consortium has prepared a set of DRT master input tapes using various microphones and ambient acoustic noise backgrounds. These tapes are in the possession of this office and are available for DRT testing. Table 1 is a summary of these tapes. In addition, master DRT tapes as indicated in Tables 3, 4, and 5 are also available.

#### 2.3.1 THE TEST BOOKLET

Each listener who is tasked to evaluate a processed tape recording has before him a four page test booklet for each speaker he will hear. The booklet is sufficient to score one half test. The booklet is shown in Figures 2a through 2d. The speech material the listener hears consists of 232 words uttered by each speaker. The words are one word from each of the word pairs in the test booklet. The listener is instructed to strike out the word he thinks he hears. The booklet is structured so that the word pairs on Figures 2a and 2c are the same but presented in the reverse order. Similarly, the word pairs on Figures 2b and 2d are the same but appear in reverse order. In addition, the present state of each of the six attributes are represented by the left word in each column on Figures 2a and 2b while the absent state is represented by the right word in each column on those pages. The reverse is true for Figures 2c and 2d.

Table 1. Available Master DRT Tapes

Tape ID	DRT TAPES Speaker / List	*Environment	**Microphone					
			1	2	3	4	5	6
E-1-A	LL 302A, CH 308B, RH 310A	Quiet	X	X	X	X		
E-1-B	JE 306A, BV 303A, PK 309A	"	X	X	X	X		
E-2-A	LL 302B, CH 307A, RH 310B	"	X	X	X	X		
E-2-B	JE 306B, BV 303B, PK 312B	"	X	X	X	X		
E-3-A	LL 301A, CH 308A, RH 311A	"	X	X	X	X		
E-3-B	JE 305A, BV 304A, PK 312A	"	X	X	X	X		
E-4-A	LL 301B, CH 307B, RH 311B	"	X	X	X	X		
E-4-B	JE 305B, BV 304B, PK 309B	"	X	X	X	X		
E-5-A	JS 317A, LS 315A, MP 314A	"	X	X	X	X		
E-5-B	JS 317B, LS 315B, MP 314B	"	X	X	X	X		
E-6-A	JS 318A, LS 316A, MP 313A	"	X	X	X	X		
E-6-B	JS 318B, LS 316B, MP 313B	"	X	X	X	X		
G-1-A	RH 318A, JE 310A, CH 314A	ABCP	X		X		X	
G-1-B	RH 318B, JE 310B, CH 314B	"	X		X		X	
G-2-A	RH 317A, JE 309A, CH 313B	HEL	X		X			X
G-2-B	RH 317B, JE 309B, CH 313A	"	X		X			X
G-3-A	RH 303A, JE 311A, CH 315A	SHIP	X		X		X	
G-3-B	RH 303B, JE 311B, CH 315B	"	X		X		X	
G-4-A	RH 304A, JE 312A, CH 316A, JS 305A	Office	X		X		X	
G-4-B	RH 304B, JE 312B, CH 316B, JS 305B	"	X		X		X	

\*Environment: Ambient Acoustic Noise Simulated in a Sound Room.

ABCP - Airborne Command Post

HEL - Helicopter

SHIP - Shipboard

\*\* See Table 2 for microphone identification.

**Table 2 Microphone Identification Used in Table 1.**

1 - Altec 659A Dynamic Microphone
2 - Western Electric T1 Carbon Microphone
3 - Grason-Stadler E7300M Throat Microphone
4 - General Radio 1580-P5 Ceramic Studio Microphone
5 - Roanwell Dynamic Noise Cancelling Microphone
6 - Electrovoice M-78/AIC Dynamic Helicopter Microphone

**Table 3 Available Word Lists and Speakers (100 Series)**

Word List	Speaker	Word List	Speaker
102A	BV	108A	CH
102B	BV	108B	CH
103A	BV	111A	JE
103B	BV	111B	JE
104A	RD	112A	SN
104B	RD	112B	SN
105A	RD	113A	JE
105B	RD	113B	JE
106A	BL	115A	SN
106B	BL	115B	SN
107A	CH	116A	BL
107B	CH	116B	BL

**Table 4. E-4a Advanced Airborne Command Post Master DRT Tapes**

Tape ID	DRT Tapes Speaker/List	Environment	*Microphone				
			1	2	3	4	5
S-1-A	SM 301A, SK 307A, BD 311A	Quiet	X	X	X	X	
S-1-B	III 303A, MM 305A, IP 309A	Quiet	X	X	X	X	
S-2-A	SM 301B, SK 307B, BD 311B	Quiet	X	X	X	X	
S-2-B	III 303B, MM 305B, IP 309B	Quiet	X	X	X	X	
T-1-A	SM 302A, SK 308A, BD 312A	E-4A Noise	X	X	X		X
T-1-B	III 304A, MM 306A, IP 310A	E-4A Noise	X	X	X		X
T-2-A	SM 302B, SK 308B, BD 312B	E-4A Noise	X	X	X		X
T-2-B	III 304B, MM 306B, IP 310B	E-4A Noise	X	X	X		X

**\*Microphones:**

- 1 - ALTEC 659A Dynamic Microphone
- 2 - Roanwell Confidencer Microphone P/N 240100001
- 3 - Grason-Stadler E7300M Throat Microphone
- 4 - General Radio 1560-P5 Ceramic Studio Microphone
- 5 - Noise only - General Radio 1560-P5

**Table 5. E-3A AWACS Master DRT Tapes**

Tape ID	DRT Tapes Speaker/List	Environment	*Microphone				
			1	2	3	4	5
S-3-A	CH 301A, JE 305A, SM 309A	Quiet	X	X	X	X	
S-3-B	IP 303B, MC 307A, GM 311A	Quiet	X	X	X	X	
S-4-A	CH 301B, JE 305B, SM 309B	Quiet	X	X	X	X	
S-4-B	IP 303A, MC 307B, GM 311B	Quiet	X	X	X	X	
T-3-A	CH 302A, JE 306A, SM 310A	E-3A Noise	X	X	X		X
T-3-B	IP 304A, MC 308A, GM 312B	E-3A Noise	X	X	X		X
T-4-A	CH 302B, JE 306B, SM 310B	E-3A Noise	X	X	X		X
T-4-B	IP 304B, MC 308B, GM 312A	E-3A Noise	X	X	X		X

**\*Microphones:**

- 1 - ALTEC 659A Dynamic Microphone
- 2 - H-335/A1C Headset Microphone
- 3 - Grason-Stadler E7300M Throat Microphone
- 4 - General Radio 1560-P5 Ceramic Studio Microphone
- 5 - Noise only - General Radio 1560-P5

DRT 11' N.

(A)

ROW

1	GOB - BOB	COOT - TOOT
2	DAUNT - TAUNT	BOND - POND
3	MOOT - BOOT	MOAN - BONE
4	SHEET - CHEAT	VILL - BILL
5	JAB - GAB	jest - guest
6	POT - TOT	FOUGHT - THOUGHT
7	GHOST - BOAST	COOP - POOP
8	LIP - RIP	LEAP - REAP
9	ZED - SAID	VAST - FAST
10	GNAW - DAW	KNOCK - DOCK
11	SHOES - CHOOSE	THOSE - DOZE
12	CHEEP - KEEP	SING - THING
13	BANK - DANK	MET - NET
14	GOT - DOT	CAUGHT - TAUGHT
15+	LOAD - ROAD	LEWD - RUDE
16	DINT - TINT	BEAN - PEEN
17	NECK - DECK	MAD - BAD
18	THONG - TONG	VOX - BOX
19	CHOO - COO	JOE - GO
20	WEED - REED	BID - DID
21	SHAG - SAG	YEN - WEN
22	LOT - ROT	LAW - RAW
23	VOLE - FOAL	ZOO - SUE
24	NIP - DIP	NEED - DEED
25	FENCE - PENCE	THAN - DAN
26	SAW - THAW	CHOP - COP
27	POOL - TOOL	FORE - THOR
28	YIELD - WIELD	HIT - FIT
29	LAP - RAP	LEST - REST

Name \_\_\_\_\_

Date / Time \_\_\_\_\_

Figure 2a. DRT Test Booklet

## DRT IV Nr.

(8)

ROW

1	PEST - TEST	FAN - PAN
2	VAULT - FAULT	JOCK - CHOCK
3	NEWS - DUES	NOTE - DOTE
4	VEE - BEE	THICK - TICK
5	SANK - THANK	CHAIR - CARE
6	WAD - ROD	BONG - DONG
7	SHOW - SO	YOU - RUE
8	LID - RID	LEEK - REEK
9	DENSE - TENSE	GAFF - CALF
10	MOSS - BOSS	MOM - BOMB
11	FOO - POOH	THOUGH - DOUGH
12	ZEE - THEE	JILT - GILT
13	FAD - THAD	PENT - TENT
14	HOP - FOP	YAWL - WALL
15+	LOW - ROW	LOOT - ROOT
16	GIN - CHIN	VEAL - FEEL
17	MEND - BEND	NAB - DAB
18	SHAW - CHAW	VON - BON
19	JUICE - GOOSE	SOLE - THOLE
20	PEEK - TEAK	FIN - THIN
21	GAT - BAT	KEG - PEG
22	LOCK - ROCK	LONG - WRONG
23	GOAT - COAT	DUNE - TUNE
24	MIT - BIT	MEET - BEET
25	THEN - DEN	SHAO - CHAD
26	JAWS - GAUZE	JOT - GOT
27	MOON - NOON	BOWL - DOLE
28	KEY - TEA	GILL - DILL
29	LAMP - RAMP	LEND - REND

Name \_\_\_\_\_

Date / Time \_\_\_\_\_

Figure 2b. DRT Test Booklet

## CRT IV Nr.

(c)

ROW

1	BOB - GOB	TOOT - COOT
2	TAUNT - DAUNT	POND - BOND
3	BOOT - MOOT	BONE - MOAN
4	CHEAT - SHEET	BILL - VILL
5	GAB - JAB	GUEST - JEST
6	TOT - POT	THOUGHT - FOUGHT
7	BOAST - GHOST	POOP - COOP
8	RIP - LIP	REAP - LEAP
9	SAID - ZED	FAST - VAST
10	DAW - GNAW	DOCK - KNOCK
11	CHOOSE - SHOES	DOZE - THOSE
12	KEEP - CHEEP	THING - SING
13	DANK - BANK	NET - MET
14	DOT - GOT	TAUGHT - CAUGHT
15+	ROAD - LOAD	RUDE - LEWD
16	TINT - DINT	PEEN - BEAN
17	DECK - NECK	BAD - MAD
18	TONG - THONG	BOX - VOX
19	COO - CHOO	GO - JOE
20	REED - WEED	DID - BID
21	SAG - SHAG	WREN - YEN
22	ROT - LOT	RAW - LAW
23	FOAL - VOLE	SUE - ZOO
24	DIP - NIP	DEED - NEED
25	PENCE - FENCE	DAN - THAN
26	THAW - SAW	COP - CHOP
27	TOOL - POOL	THOR - FORE
28	WIELD - YIELD	FIT - HIT
29	RAP - LAP	REST - LEST

NameDate/Time

Figure 2c. DRT Test Booklet

ORT IV Nr.

(D)

ROW

1	TEST - PEST	PAN - FAN
2	FAULT - VAULT	CHOCK - JOCK
3	DUES - NEWS	DOTE - NOTE
4	BEE - VEE	TICK - THICK
5	THANK - SANK	CARE - CHAIR
6	ROD - WAD	DONG - BONG
7	SO - SHOW	RUE - YOU
8	RID - LID	REEK - LEEK
9	TENSE - DENSE	CALF - GAFF
10	BOSS - MOSS	BOMB - MOM
11	POOH - FOO	COUGH - THOUGH
12	THEE - ZEE	GILT - JILT
13	THAD - FAD	TENT - PENT
14	FOP - HOP	WALL - YAWL
15	ROW - LOW	ROOT - LOOT
16	CHIN - GIN	FEEL - VEAL
17	BEND - MEND	DAB - NAB
18	CHAW - SHAW	BON - VON
19	GOOSE - JUICE	THOLE - SOLE
20	TEAK - PEEK	THIN - FIN
21	BAT - GAT	PEG - KEG
22	ROCK - LOCK	WRONG - LONG
23	COAT - GOAT	TUNE - DUNE
24	BIT - MIT	BEET - MEET
25	DEN - THEN	CHAD - SHAD
26	GAUZE - JAWS	GOT - JOT
27	NOON - MOON	DOLE - BOWL
28	TEA - KEY	DILL - GILL
29	RAMP - LAMP	REND - LEND

Name \_\_\_\_\_

Date / Time \_\_\_\_\_

Figure 2d. DRT Test Booklet

### 2.3.2 THE MAJOR ATTRIBUTES

The six attributes tested by the DRT are VOICING, NASALITY, SUSTENTION, SIBILATION, GRAVENESS, and COMPACTNESS. Each of the 192 word pairs in a half-test has been selected so that the leading consonant differs only in the present or absent state of a single attribute. The particular attribute tested by each word pair is shown in Figure 3. The 1st, 8th, 15th, 22nd and last words in each column are not scored. These words are included to allow time for turning pages, moving to the top of the next column, and for inclusion of experimental words. A couple of examples will serve to clarify this.

Example 1. In Figure 2a, the 11th word pair in the left hand column is SHOES-CHOOSE. In Figure 3, the attribute corresponding to the 11th word pair is SUSTENTION. Thus, the word pair SHOES-CHOOSE tests the attribute SUSTENTION. Further, since this word pair is shown on the first page of the booklet, the leading consonant in SHOES exhibits the present state of the attribute while the leading consonant of the word CHOOSE exhibits the absent state of the attribute, thus, SHOES represents a SUSTAINED consonant while CHOOSE represents an ABRUPT consonant.

Example 2. In Figure 2d, the third word pair in the right column is DOTE-NOTE. From Figure 3, it can be seen that this word pair tests the attribute NASALITY. Since this word pair is shown on the fourth page of the booklet, we observe that DOTE represents the absent state of NASALITY (Non-Nasal) while NOTE represents the present state of NASALITY (Nasal).

### 2.3.3 THE SUB-FEATURES

The following constraints were observed in constructing the set of test words:

- (a) Half of the items designed to test VOICING are fricatives; the other half are stop consonants,
- (b) Half of the NASALITY phoneme pairs are grave; the rest acute,
- (c) Half of the SUSTENTION items are voiced; half unvoiced,
- (d) Half of the phoneme pairs that test SIBILATION are voiced, the remainder unvoiced,
- (e) Half of the GRAVENESS test items are voiced; the other half unvoiced,
- (f) Half of the COMPACTNESS items are voiced; the remainder unvoiced.

Row	Filler	Filler
1		
2	Voicing	Voicing
3	Nasality	Nasality
4	Sustentation	Sustentation
5	Sibilation	Sibilation
6	Graveness	Graveness
7	Compactness	Compactness
8	Experimental	Experimental
9	Voicing	Voicing
10	Nasality	Nasality
11	Sustentation	Sustentation
12	Sibilation	Sibilation
13	Graveness	Graveness
14	Compactness	Compactness
15	Experimental	Experimental
16	Voicing	Voicing
17	Nasality	Nasality
18	Sustentation	Sustentation
19	Sibilation	Sibilation
20	Graveness	Graveness
21	Compactness	Compactness
22	Experimental	Experimental
23	Voicing	Voicing
24	Nasality	Nasality
25	Sustentation	Sustentation
26	Sibilation	Sibilation
27	Graveness	Graveness
28	Compactness	Compactness
29	Experimental	Experimental

Figure 3. Attribute Tested-Word Pair Position

Figure 4 can be used in conjunction with Figures 2a-d and 3 to determine exactly which word pairs are presented with the sub-features indicated above. A plus (+) in Figure 4, indicates that the two words exhibit the present state of the sub-feature; a minus (-) the absent state. The sub-feature assignments are the same for pages 1 and 3 of the DRT test booklet as well as for pages 2 and 4. The columns of pluses and minuses in Figure 4, correspond to the columns of word pairs in the DRT test booklet. Notice that in Figure 3 each major attribute is tested four times in each column. Thus, there are four pluses and minuses in each column for each major attribute in Figure 4. The following examples will serve to illustrate the use of Figures 2a-d, 3, and 4 to determine the major attribute and sub-feature of each word pair.

<u>Page No.</u>	<u>VOICING</u>	<u>NASALITY</u>	<u>SUSTENTION</u>	<u>SIBILATION</u>	<u>GRAVENESS</u>	<u>COMPACTNESS</u>	
1&3	- -	+ +	- +	+ +	- -	+ -	
	+ +	- -	- +	- -	+ +	+ -	
	- -	- +	- +	- +	+ +	- +	
	+ +	- -	- +	- -	- -	+ -	
2&4	+ +	- -	+ -	- -	+ +	- +	
	- -	+ +	- +	+ +	- -	- +	
	+ +	+ -	- +	+ -	- -	+ -	
	- -	+ +	+ -	+ +	+ +	- +	
<u>Main Attribute</u>		<u>Sub-Feature (+/-)</u>					
		Voicing	Frictional/Non-Frictional				
		Nasality	Grave/Acute				
		Sustention	Voiced/Unvoiced				
		Sibilation	Voiced/Unvoiced				
		Graveness	Voiced/Unvoiced				
		Compactness	Voiced/Unvoiced				

Figure 4. Sub-Feature State Location in Test Booklet

Example 1. The second word pair shown on page 1 of the DRT test booklet (Figure 2a) in the left column is DAUNT-TAUNT. Figure 3 indicates that this word pair tests the attribute VOICING. Since this word pair is shown on page 1, (Figure 2a) we conclude that DAUNT represents the voiced case and TAUNT represents the unvoiced case. Referring to Figure 4, we observe that the first pair of words in the left hand column of page 1 of the DRT test booklet that tests the attribute VOICING exhibit the absent (-) state of the sub-feature. That is, the words DAUNT and TAUNT are non-frictional. The word pair ZED-SAID shown on page 1 (Figure 2a) also tests the VOICING attribute. However, these words are frictional.

This can be observed by noting that they are the second word pair in the left column shown on page 1 (Figure 2a) that tests the attribute VOICING. Figure 4 indicates that these two words are frictional (+).

Example 2. The 17th word pair shown on page 4 of the DRT test booklet (Figure 2d) in the right column is DAB-NAB. From Figure 3, we ascertain that this word pair tests the attribute NASALITY. Further, since this word pair is shown in page 4 (Figure 2d), we conclude that DAB is non-nasal and NAB is nasal. The sub-feature for NASALITY is graveness. Referring to Figure 4 we see that the third word pair in the right column shown on page 4 (Figure 2d) that tests the attribute NASALITY exhibits the absent (-) state of the sub-feature graveness. Thus the leading consonant of the word DAB is non-nasal and acute while the leading consonant of the word NAB is nasal and acute. In contrast, the 17th word pair in the left column shown on page 4 (Figure 2d) is BEND-MEND. This pair also tests NASALITY. Figure 4 indicates that these words are grave (+).

#### 2.3.4 THE WORD LISTS

The words in Figures 2a-d have been spoken by each speaker in a predetermined sequence called a word list. Each word list is identified by a three digit number followed by the letter A or B. The letter A is used to identify the first half of the DRT and B to identify the second half. Tables 1, 3, 4, and 5 contain summaries of word lists available and the associated speaker's initials. Appendix A contains the actual word lists.

### 3. EARLY IN-HOUSE DEVELOPMENT

#### 3.1 Rationale

The DRT has proven itself to be a useful diagnostic tool for finding weaknesses in narrowband digital voice processing algorithms. However, the cost of a DRT using contractor resources was considered too high (approximately \$550.00 for a six speaker DRT in FY 78) to make it practical for testing the many algorithm changes required on a week to week basis. In addition, the cost was too high to repeat the test for each configuration in order to obtain estimates of measurement errors needed for a complete statistical analysis (that is, Analysis of Variance<sup>4</sup>). It was determined that DRTs could be conducted at the Air Force Voice Processing Facility, Hanscom Air Force Base using existing hardware for approximately one-tenth the contractor cost, excluding the scoring software development costs. In-house resources were to be used to develop the software.

4. Guenther, W.C. (1964) Analysis of Variance, Prentice-Hall, Inc., Englewood Cliffs, N.J.

### 3.2 Scoring Software - CSP-30 Implementation

The DRT scoring software was written in FORTRAN IV and implemented on the CSP-30 High Speed Signal Processor. Figure 5 shows flow charts of the scoring programs as implemented on the CSP-30. The program listing and a sample printout of the test results for a two-speaker, two-listener DRT are contained in Appendix B.

#### 3.2.1 PROGRAM USAGE

The scoring software as implemented on the CSP-30 requires manual data entry via the ADDS Video Terminal. The program is used as follows:

- a. Load the 32K FORTRAN MIOCS.
- b. Load the DRT Scoring Program (Cartridge Output).
- c. Run at starting address = 0.
- d. Be sure line printer is on-line.
- e. The ADDS terminal will display:

INSERT 150 FT CARTRIDGE IN UPPER DECK

I/O RESET - CONTINUE.

Be sure the cartridge is write enabled. Insert it into the upper Tri-Data deck.

- f. After carrying out the above instructions the ADDS terminal will display:  
SYSTEM UNDER TEST?

SS

Input up to 50 ASCII characters to identify the system under test, date, etc.

- g. ADDS will display:  
HOW MANY LISTENERS?  
LL

Input an integer from 1 to 12 in I2 format.

- h. ADDS will display:  
HOW MANY SPEAKERS?  
SS

Input an integer from 1 to 6 in I2 format.

- i. For I = 1 to the number of listeners the ADDS will display:  
LISTENER I NAME  
NNNNNNNNNNNNNNNNNNNNNNNNNN

Input up to 24 ASCII characters to identify the listener.

The following steps j through r will occur for each listener I and each speaker J:

- j. ADDS will display:  
FOR LISTENER I SPEAKER J  
ENTER KEY NUMBER AND LETTER  
NNNL

Enter the word list number in I3 format followed by the suffix letter in ASCII.

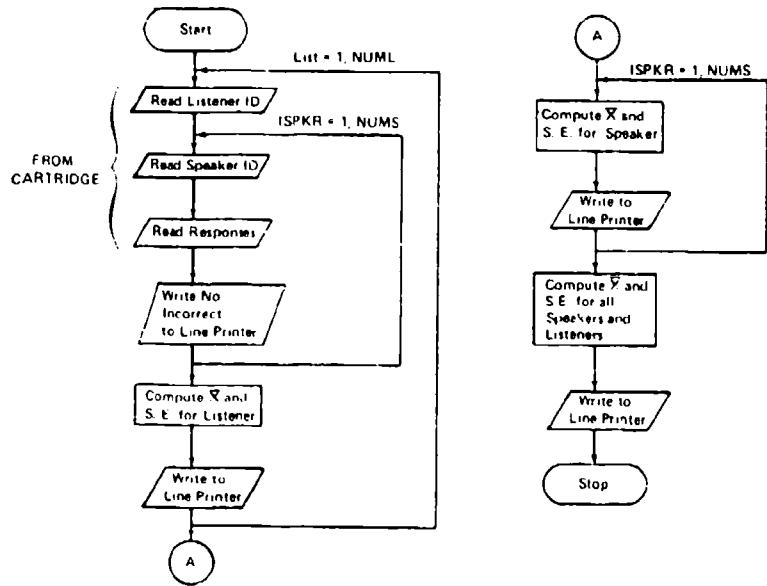
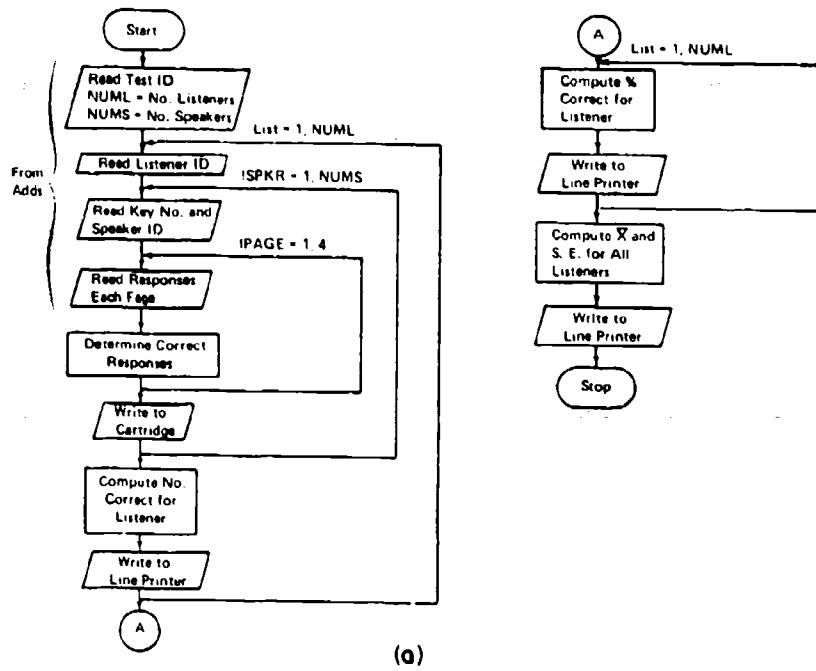


Figure 5. DRT Scoring

k. If no such key is in the program the ADDS will display:

\*\*\*\*\*NO KEY XXXA\*\*\*\*\*

where XXXA is the key entered: The program will go to step j above. If the key is a valid one in the 100 series, the ADDS will display:

KEY = XXXA SPEAKER

IF OK ENTER Ø

where XXXA is the key entered and SPEAKER is the speaker identification associated with that key as stored in the program. However, if the key entered is a 300 series key, the ADDS will display:

SPEAKER?

SS

Enter two (2) ASCII characters identifying the speaker. ADDS will then display:

-- KEY = XXXA SPEAKER

IF OK ENTER Ø

If anything other than Ø is entered the program returns to step j above. Steps 1 through p below occur for each page, K= 1, 2, 3, 4 of the answer booklet (see Figures 2a through 2d).

l. ADDS will display:

FOR KEY XXXA LISTENER I PAGE K ENTER RESPONSE BY COLUMNS

1 = FIRST WORD 2 = SECOND WORD

RRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRR

For the first column of each word pair on page K of listener I's answer book enter a 1 if the first word of the pair was selected or a 2 if the second word was selected. After the first column has been entered hit new line. Enter the second column in the same way.

m. ADDS will display a graphic representation of the first 15 rows of the page just entered. An example is:

1	XXXXX	XXXXX
2	XXXXX	XXXXX
3	XXXXX	XXXXX
4	XXXXX	XXXXX
5	XXXXX	XXXXX
6	XXXXXXXXXXXXXX	XXXXX
7	XXXXX	XXXXX
8	XXXXX	XXXXX
9	XXXXX	XXXXX
10	XXXXX	XXXXX
11	XXXXX	XXXXX
12	XXXXXXXXXXXXXX	XXXXX
13	XXXXX	XXXXX
14	XXXXX	XXXXX
15	XXXXX	XXXXX
IF OK ENTER Ø		

This allows you to check for errors in key punching the entries of the first 15 rows. Notice that rows 6 and 12 in column 1 contain X's in both first and second word

positions. This indicates that something other than 1 or 2 was entered in those positions and corrections should be made.

- n. If no corrections are needed enter 0 followed by new line. Anything other than 0 implies a correction is to be made. ADDS will display:

ROW AND COLUMN TO CHANGE? ENTER 999 TO CHANGE ENTIRE PAGE

RRC

Enter the row number in 12 format followed by the column number in 11.

- o. If 999 was entered program will go to step 1 above. If a row outside the range 1 to 29, other than 99, or a column other than 1 or 2 is entered, program goes to step n above. If row and column are within the specified range, ADDS displays:

NEW ENTRY?

R

Enter a 1 or 2. Program goes to step m above.

- p. After corrections to rows 1 through 15 are made, rows 16 through 29 are displayed and corrected in a similar manner. (NOTE: Corrections to any row can be made regardless of the rows being displayed.)

q. After all pages for listener 1, key XXXA have been scored, the next speaker is scored in the same way. After all speakers for listener 1 have been scored the data is output to the cartridge and a printout of listener 1's correct responses is made.

- r. The next listener is scored in the same way.
- s. After all listeners have been scored, a percent correct printout is made for each listener using the transformation

$$\text{SCORE} = \frac{R-W}{T} \times (100)$$

Where R = Number correct

W = Number incorrect

T = Total number of items

- t. A summary of all scores and standard errors across listeners is then printed (see Appendix B). Program stops.

- u. Load the DRT Scoring Program (Cartridge Input).

- v. Run at starting address = 0.

- w. ADDS will display:

INSERT CARTRIDGE IN UPPER DECK

I/O RESET-CONTINUE

Insert the cartridge containing the DRT data into the upper Tri-Data deck. After hitting I/O Reset and Continue, the program will execute as in Figure 5b. A comprehensive printout of DRT results will be made as shown in Appendix B. No further interaction with the ADDS terminal is required.

### 3.3 Listeners

It was considered crucial to the success of the in-house DRT program that sufficient numbers of listeners be recruited and that their performance on the DRT be consistent. The reliability of the DRT as a useful tool in measuring intelligibility so that meaningful comparisons between voice systems can be made is dependent on the repeatability of the scores. That is, if a particular DRT is administered to a crew of listeners at different points in time, are the results different? If they are, the credibility of the test is in question. It has been shown that the DRT is highly reliable in this regard if a properly selected and trained listening crew is used.<sup>5</sup>

In addition, for the in-house DRT program to be of maximum utility, the results obtained should be comparable to those obtained by others who administer the same test to their listeners. In particular, we felt it essential that in-house DRT results be comparable to those obtained by Dynastat, Inc.

During the period February-October 1976, 21 volunteer listeners participated in DRT tests to determine the feasibility of implementing an in-house DRT program. The volunteers were recruited from the Hanscom AFB community. They consisted of U.S. Air Force military, civilian employees, military dependents and in-house contractor personnel. Each listener was subjected to a pure tone audiometric test for hearing loss and passed the requirements for an H-1 profile as specified in AFM 160-1 (C9) Attachment 3, 2 May 1975. During the period February-March 1976 four listening sessions were conducted. Each session was approximately two hours in duration. From four to seven listeners participated in each session. The purpose of this initial trial period was to gain some insight into the feasibility of conducting in-house DRTs and to determine if comparability with contractor results can be obtained. A second trial period consisting of three sessions was conducted in October 1976. The purpose of this trial period was to measure the repeatability of scores for in-house DRTs and to detect any significant learning trends when a listener is repeatedly exposed to the same test. Seven listeners were used during this second trial period. All but two had been used in the previous tests.

#### 3.3.1 COMPARABILITY

Tables 6a to 6e contain summaries of the results of in-house listening Sessions 2, 3, and 4 conducted during February and March 1976 as well as Dynastat scores for the same DRT tapes. The systems used in the tests were all vocoders at various narrowband data rates. Only those scores for listeners who participated in two or more sessions are reported. Session 1 is not included because it served as an orientation for the listeners. The tables also include 95 percent confidence intervals

5. Votter, W. D. (1965) Performance Evaluation of Speech Processing Devices II, The Role of Individual Differences, AFCRL-66-24.

based on the Dynastat means and standard errors. In addition, the differences between in-house and Dynastat means are included. Those in-house mean scores that lie outside the confidence interval are marked with an asterisk (\*). Some observations follow:

- a. No attempt was made to screen and eliminate listeners for the purpose of improving in-house means.
- b. Of the listeners used in this trial period only two participated in three sessions. All others participated in two or fewer sessions.
- c. The general tendency for in-house scores was to approach Dynastat scores as listeners gained experience. In the second listening session seven in-house means fell below their confidence intervals while six fell below their confidence intervals for Sessions 3 and 4. The median difference between in-house and Dynastat means improved from -3.2 to -2.05 from Session 2 to Session 3. For Session 4 the median difference was -2.3.

Table 6a. In-House and Dynastat DRT Scores.  
Listening Session 2 - 25 Feb 1976

System	Speaker	IN-HOUSE					DYNASTAT				DIFF	
		LISTENER					MEAN	MEAN	S.E.	95% C.I.		
		1 <sup>a</sup>	2 <sup>b</sup>	3 <sup>a</sup>	5 <sup>a</sup>	6 <sup>a</sup>						
1102	BL	87.5	87.5	86.5	76.0	89.6	84.4*	89.6	1.35	(86.4, 92.8)	-5.2	
	CH	86.5	89.6	88.5	84.4	87.5	87.3	89.8	1.19	(87.0, 92.6)	-2.5	
	SN	82.3	72.9	82.3	76.0	78.1	78.3*	83.5	1.27	(80.5, 86.5)	-5.2	
1103	BL	89.6	82.3	88.5	85.4	87.5	86.7	86.6	1.74	(82.5, 90.7)	+0.1	
	CH	91.7	85.4	85.4	87.5	90.6	88.1*	91.7	0.88	(89.6, 93.8)	-3.6	
	SN	75.0	74.0	78.1	80.2	75.0	76.5*	79.7	1.04	(77.2, 82.2)	-3.2	
1104	BL	85.4	82.3	86.5	85.4	85.4	85.0*	88.3	1.19	(85.5, 91.1)	-3.3	
	CH	93.8	85.4	88.5	85.4	87.5	88.1	90.8	1.16	(88.1, 93.5)	-2.7	
	SN	83.3	82.3	81.3	80.2	81.3	81.7	82.8	1.55	(79.1, 86.5)	-1.1	
1105	BL	81.3	79.2	83.3	79.2	82.3	81.1*	84.8	1.23	(81.9, 87.7)	-3.7	
	CH	87.5	83.3	83.3	84.4	88.5	85.4	88.5	1.67	(84.6, 92.4)	-3.1	
	SN	82.3	76.0	82.3	80.2	74.0	79.0*	82.2	0.80	(80.3, 84.1)	-3.2	

a - First session for this listener.

b - Second session for this listener.

\* - Below 95% confidence interval.

Table 6b. In-House and Dynastat DRT Scores.  
Listening Session 3 - 4 Mar 1976

System	Speaker	IN-HOUSE				DYNASTAT				DIFF	
		LISTENER				MEAN	MEAN	S.E.	95% C.I.		
		1 <sup>a</sup>	2 <sup>b</sup>	3 <sup>c</sup>	4 <sup>c</sup>						
1106	BL	82.3	86.5	93.8	80.2	85.7	87.8	1.70	(83.3, 91.8)	-2.1	
	CH	88.5	90.6	90.6	83.3	88.1*	91.7	0.86	(89.7, 93.7)	-3.4	
	SN	74.0	83.3	91.7	77.1	81.5	82.2	1.09	(77.7, 86.7)	-0.7	
1108	BL	86.5	86.5	92.7	84.4	88.0	88.2	1.69	(84.2, 92.2)	-0.2	
	CH	88.5	95.8	90.6	88.5	90.1*	91.9	0.73	(90.2, 93.6)	-1.8	
	SN	76.0	89.6	87.5	82.3	83.9	85.9	1.73	(81.8, 90.0)	-2.0	
1110	BL	86.5	89.6	87.5	86.5	87.5*	92.6	1.05	(90.1, 95.1)	-5.1	
	CH	85.4	87.5	93.8	83.3	87.5*	93.0	0.70	(91.3, 94.7)	-5.5	
	SN	76.0	86.5	82.3	82.3	81.8	83.2	1.57	(79.5, 86.9)	-2.0	
1112	BL	86.5	93.8	91.7	88.5	90.1*	92.4	0.67	(90.8, 94.0)	-2.3	
	CH	90.6	87.5	92.7	95.8	91.7*	94.8	1.08	(92.2, 97.4)	-3.1	
	SN	85.4	88.5	87.5	84.4	86.5	87.0	1.59	(83.2, 90.8)	-0.5	

\* - Second session for this listener.

\* - Below 95% confidence interval.

Table 6c. In-House and Dynastat DRT Scores.  
Listening Session 4 - 22 Mar 1976

System	Speaker	IN-HOUSE				DYNASTAT				DIFF	
		LISTENER				MEAN	MEAN	S.E.	95% C.I.		
		1 <sup>a</sup>	2 <sup>b</sup>	3 <sup>c</sup>	4 <sup>c</sup>						
1113	BL	90.6	86.5	89.6	85.4	88.0	90.1	0.90	(88.0, 92.2)	-2.1	
	CH	92.7	89.6	89.6	91.7	90.9	92.2	0.65	(90.7, 93.7)	-1.3	
	SN	80.2	86.5	89.6	83.3	84.9*	88.0	1.15	(85.3, 90.7)	-3.1	
1146	BL	90.6	87.5	88.5	86.5	88.3*	90.8	0.80	(88.9, 92.7)	-2.5	
	CH	92.7	92.7	92.7	92.7	92.7	94.8	0.88	(92.7, 96.9)	-2.1	
	SN	81.3	84.4	87.5	86.5	84.9*	91.3	1.16	(88.6, 94.0)	-6.4	
1150	BL	87.5	85.4	96.9	85.4	88.8	88.4	0.89	(86.3, 90.5)	+0.4	
	CH	92.7	90.6	90.6	92.7	91.7*	94.4	0.71	(92.7, 96.1)	-2.7	
	SN	84.4	81.3	85.4	86.5	84.4*	88.8	1.14	(86.1, 91.5)	-4.4	
1152	BL	88.5	91.7	94.8	89.6	91.2	92.2	0.81	(90.3, 94.1)	-1.0	
	CH	92.7	88.5	89.6	88.5	89.8*	92.8	0.80	(90.9, 94.7)	-3.0	
	SN	85.4	83.3	85.4	86.5	85.7	87.4	1.05	(84.9, 89.9)	-1.7	

\* - Second session for this listener.

\* - Third session for this listener.

\* - Below 95% confidence interval.

### 3.3.2 REPEATABILITY

During the three listening sessions in October 1976 seven listeners were exposed repeatedly to the same DRT tape. Speaker CH was used for all repetitions. Table 7 contains a summary of the number of repetitions each listener participated in for each of the three sessions. Table 8 contains the mean and standard deviation across repetitions for each listener for each session. For those listeners that participated in two sessions the tendency was for the mean score to rise slightly and the standard deviation to decrease. This is what might be expected from listeners who are relatively inexperienced and are still rising on the "learning curve." A simple linear regression model was fitted to the data for each listener for each session. The independent variable was the repetition number; the dependent variable the DRT score. The intent was to examine the slope of the regression line to determine if a significant linear trend in the listeners' scores existed. Table 9 contains the intercept and slope for each listener as well as a 95 percent confidence interval for the slope of each line. The confidence interval did not contain zero in only two of the twelve cases. This means that the slopes of the remaining ten lines are not significantly different from zero indicating no significant learning trend. Further analysis consisted of computing the DRT mean and standard error across listeners for each repetition during the first and last listening sessions. Table 10 contains these results. Figure 6 is a scatter diagram of this data and contains a linear regression line for each session. The slope of each of these lines is significantly different from zero, however, it can be observed that the rate of increase is smaller for the third session than for the first session. Additionally, the standard errors in Table 10 are reducing and becoming more consistent as the listeners gain experience. Also included in Figure 6 is a 95 percent confidence interval for the mean score for speaker CII based on the mean obtained by Dynastat for the same tape used in our in-house sessions. A reliable estimate for the standard error for this score is not available. However, typical standard errors obtained by Dynastat for speaker CII when the mean is near 93.0 are less than 1.00. The confidence interval shown in Figure 6 was constructed using an estimated standard error of 0.75. All in-house scores for the 20 October 1976 session lie within the confidence interval as well as four of the last five scores on 6 October 1976.

The foregoing results led to the conclusion that a properly selected and trained listening crew used in an in-house program could produce results that are not only repeatable but also comparable to those obtained by Dynastat.

**Table 7. Number of DRT Repetitions  
Listeners Were Exposed to for Speaker  
CH**

Listener	6 Oct 76	12 Oct 76	20 Oct 76
4	9	0	9
8	9	0	9
9	9	9	0
10	9	0	9
11	9	8	0
13	0	0	12
14	0	0	12

**Table 8. DRT Means and Standard Deviations Across  
Repetitions for Each Listener at Each Session**

Listener	6 Oct 76		12 Oct 76		20 Oct 76	
	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
4	93.3	2.28	-	-	95.0	1.25
8	95.6	1.86	-	-	96.8	0.63
9	92.0	1.80	92.6	2.05	-	-
10	91.6	3.10	-	-	92.9	1.79
11	87.0*	4.00	92.1	1.66	-	-
13	-	-	-	-	91.7	1.89
14	-	-	-	-	95.3	2.79

\*First exposure to the DRT for this listener.

**Table 9. Simple Linear Regression Models for Repetition (X) and DRT Score (Y) for Each Listener**

Listener	6 OCT 76			12 OCT 76			20 OCT 76		
	Intercept	Slope	95% C.I. for Slope	Intercept	Slope	95% C.I. for Slope	Intercept	Slope	95% C.I. for Slope
4	92.9	0.07	(-0.67, 0.81)	-	-	-	94.6	0.09	(-0.31, 0.49)
8	94.1	0.30	(-0.25, 0.84)	-	-	-	96.1	0.14	(-0.02, 0.30)
9	90.4	0.33	(-0.18, 0.84)	90.2	0.49	(-0.02, 0.99)	-	-	-
10	86.9	0.94*	(0.37, 1.50)	-	-	-	90.9	0.40	(-0.06, 0.86)
11	82.5	0.90	(-0.21, 2.01)	92.8	-0.16	(-0.82, 0.50)	-	-	-
13	-	-	-	-	-	-	91.2	0.07	(-0.29, 0.44)
14	-	-	-	-	-	-	90.7	0.71*	(0.50, 0.93)

\*Slope significantly different from zero.

**Table 10. DRT Mean and Standard Error Across Listeners for Each Repetition for First and Last Sessions**

Repetition	6 Oct 76		20 Oct 76	
	Mean	Std Error	Mean	Std Error
1	88.3	2.01	93.8	0.81
2	90.4	2.47	92.9	1.29
3	91.3	2.12	93.3	1.07
4	94.2	0.78	94.0	1.06
5	92.1	1.50	94.2	1.38
6	90.8	2.04	94.0	0.83
7	92.9	0.77	94.2	1.49
8	93.3	1.38	95.0	1.01
9	93.7	1.47	94.8	1.19

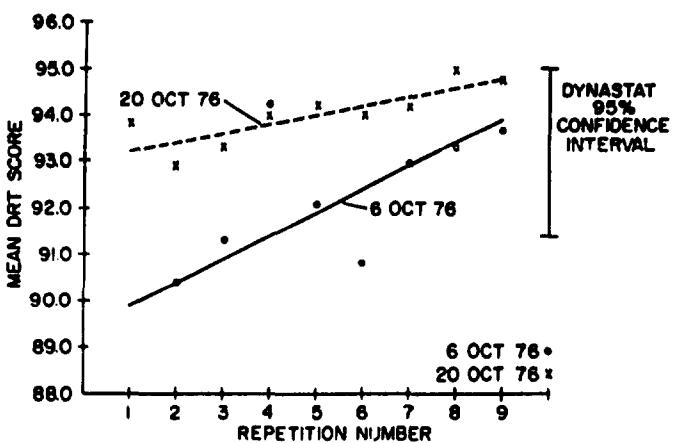


Figure 6. Scatter Diagram and Linear Regression for Mean DRT Score as a Function of Repetition Number

### 3.4 Conclusions and Recommendations

It was concluded that the DRT scoring software as implemented on the CSP-30 functioned properly, however, the manual entry of the raw data was unsatisfactory. A six speaker, ten listener DRT required approximately two hours to enter the data. The CSP-30 is a single user system, the primary function of which is research and development of voice algorithms. To dedicate the CSP-30 to the time required to enter DRT data is a waste of a valuable resource. In addition, this method of data entry proved to be susceptible to key punch errors. It was recommended that the DRT scoring software be implemented on an existing in-house PDP-11 mini-computer. It was further recommended that an optical mark reader be procured and interfaced to the PDP-11 and that special DRT test forms be designed so that automated data entry could be used in the scoring procedure.

It was further concluded that a listening crew could be trained in-house to perform in a consistent manner and obtain results comparable to those obtained by Dynastat. However, it was considered unsatisfactory to depend on volunteer listeners. Our experience was that it was difficult to obtain volunteers who were willing or able to participate in DRT listening the number of hours and frequency required for them to become consistent, reliable listeners. It was recommended that listeners be hired and that they participate in listening tests a minimum of one-half day each week.

It was further recommended that procedures be developed to recruit, train, and control the listeners and to monitor their performance. In addition, the

development of a method for screening and eliminating those listeners who are unsatisfactory was required.

#### 4. FOLLOW-ON DEVELOPMENT

The decision was made to fully develop the in-house DRT program. The recommendations of Section 3.4 were adopted and implemented. The following Sections describe this development.

##### 4.1 Optical Mark Reader

A search through several issues of the Excess ADP Equipment Bulletin published by the Defense Logistics Agency, Cameron Station, Alexandria, VA 22314 revealed that two (2) Decision Optical Mark Readers (OMR), model OMR 6510 were listed as excess. Further investigation revealed that these readers were located within ESD on Hanscom AFB. Contact with the users was immediately established. A review of the OMR documentation and discussions with the users resulted in the determination that the OMR could easily be interfaced with our PDP-11 and that forms could be designed and procured to satisfy our requirements. A no cost transfer of the OMRs to the Voice Processing Facility was accomplished. It was immediately learned that the interface hardware required was already available in our PDP-11. All that was required was to plug an existing connector into the OMR.

###### 4.1.1 OMR TEST BOOKLETS

DRT test booklets were designed and procured for use with the OMR. Two different test booklets were procured; one for the 100 series word lists (ESD Form 36) and one for the 300 series word lists (ESD Form 37). Each booklet consists of four (4) pages joined together at the left edge by a perforated binding. This is referred to as a four part snapak. This allows the pages to be separated so that they may be fed into the OMR. Figure 7 is a copy of a page from one of the booklets. The only differences between this page and other pages are the words themselves and the position of the black rectangle in the upper right hand corner. This rectangle is used to indicate the booklet page number by its location. The listeners are required to fill in certain header information on the first page of each booklet before the test begins as indicated in Figure 7. The information is entered by first writing it in the large boxes to the left of each information block. The listeners then blacken in the appropriate rectangles using a No. 2 pencil. During the test listeners strike through the word of their choice as before. After much experimentation it was determined that wide, dark marks are required over the words for reliable OMR reading. A certain amount of practice was required before the listeners

mastered the technique of properly marking the words. The time required for this practice was minimal when compared to the total listener training period. It was determined that the best marker to use is a black tube-type, felt-tip marker, Federal Stock Number 7520-00-973-1059. These markers are available in adequate supply and if stored tip down between listening sessions have a reasonable usable life. Rectangles in the extreme left and right hand margins of each test booklet page are provided to give the listener an opportunity to change his answer by simply marking through the rectangle closest to the word pair to be changed. The test form pages measure 8-1/2 in. X 11 in. after separation. They were designed on a 5446 Decision format sheet (54 columns by 46 rows). The forms were printed using Pantone Purple 185 ink (12 parts warm red, 4 parts rubine red). Complete specifications for the forms are available in the Hanscom Air Force Base, Central Base Administration (DA) office.

#### 4.1.2 SOFTWARE

The software functions required to interface the OMR to the PDP-11 and provide data that can be used by the DRT scoring software consisted of:

a. An OMR driver. This function is required to do the necessary handshaking between the OMR and the PDP-11 interface card (DC-11) and to send and receive necessary status, control, and data words.

b. A page reader. This software module is required to store an image of the test booklet page being read. It consists of filling in a 46 X 54 matrix of zeroes and ones. Each element of the matrix corresponds to a position on the test form page. A zero indicates no mark in that position, a one indicates a mark.

c. A page interpreter. This module interprets the matrix of zeroes and ones constructed by the page reader and extracts the following information:

1. System ID.
2. Listener ID.
3. Word List ID.
4. Speaker ID.
5. Page number.
6. The responses. These are stored in a similar manner as the CSP-30 version.

These functions are drawn together into a program called XXX on the PDP-11 disk file. The output of this program is a disk file containing the data described above. In addition, a program called XFLR is used before actual scoring takes place. This program accesses the data file created by XXX and creates a new file after performing the following:

d. Translates the XXX file into a new file in the format required for the scoring program.

# DIAGNOSTIC RHYME TEST

LAST NAME \_\_\_\_\_

DAY      MONTH      YEAR

SYSTEM									
0	1	2	3	4	5	6	7	8	9
0	1	2	3	4	5	6	7	8	9
0	1	2	3	4	5	6	7	8	9
0	1	2	3	4	5	6	7	8	9

WORD LIST									
0	1	2	3	4	5	6	7	8	9
0	1	2	3	4	5	6	7	8	9
0	1	2	3	4	5	6	7	8	9
0	1	2	3	4	5	6	7	8	9

LISTENER									
0	1	2	3	4	5	6	7	8	9
0	1	2	3	4	5	6	7	8	9
0	1	2	3	4	5	6	7	8	9
0	1	2	3	4	5	6	7	8	9

## SPEAKER

A	N	G	D	E	F	G	H	I	K	L	M	N	O	P	R	S	T	U	V	W	X	Y	Z
A	E	C	O	E	B	O	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T

BOB -- GOB  
 TAUNT -- DAUNT  
 BOOT -- MOOT  
 CHEAT -- SHEET  
 CAB - JAB  
 TOT - POT  
 BOAST - GHOST  
 NILL - RILL  
 SAID - ZED  
 DAW - GNAW  
 CHOOSE - SHOES  
 KEEP - CHEEP  
 DANK - BANK  
 DOT - GOT  
 NOSE - INOSE  
 TINT - DINT  
 DECK - NECK  
 TONG - THONG  
 COO - CHOO  
 REED - WEED  
 SAG - SHAG  
 ROB - KNOB  
 FOAL - VOIE  
 DIP - NIP  
 PENCE - FENCE  
 THAW - SAW  
 TOOL - POOL  
 WIELD - YIELD  
 RAT - GNAT

TOOT - COOT  
 POND - BOND  
 BONE - MOAN  
 BILL - VILL  
 GUEST - JEST  
 THOUGHT - FOUGHT  
 POOP - COOP  
 REAP - NEAP  
 FAST - VAST  
 DOCK - KNOCK  
 DOZE - THOSE  
 THING - SING  
 NET - MET  
 TAUGHT - CAUGHT  
 RUDE - NUDE  
 PEEN - BEAN  
 BAD - MAD  
 BOX - VOX  
 GO - JOE  
 DID - BID  
 WREN - YEN  
 NOUGHT - WROUGHT  
 SUE - ZOO  
 DEED - NEED  
 DAN - THAN  
 COP - CHOP  
 THOR - FORE  
 FIT - HIT  
 REST - NEST

Figure 7. DRT Test Booklet for Use With the Optical Mark Reader

e. Offers the opportunity to correct word list identification that may have been entered incorrectly.

f. Permits the elimination of selected listeners from the scoring run.

g. Permits the elimination of selected speakers from the scoring run.

The final step in the process is the execution of the scoring program itself. This program is called SCORE and is substantially the same as implemented on the CSP-30. The fundamental differences are:

h. It has been modified to accept data from the disk file rather than the ADDS terminal.

i. The printout of results has been expanded to include a page which consists of a matrix of listener/speaker scores.

Appendix C contains the listings for the above described software and an example DRT printout.

#### 4.2 Program Usage

A step-by-step procedure for using the DRT scoring software follows. It is assumed that the operating system is the RSX-11M and the user is familiar with it. The scoring programs have been written to prompt the user by asking specific questions and waiting for a reply. Also, various error messages are written on the Decwriter when OMR read errors occur. Figure 8 is a copy of the Decwriter output for a DRT scoring run. The example in Figure 8 is for a single listener and a single speaker. Items marked with an asterisk (\*) are entered by the user. Figure 9 is the resulting printout of the scoring process for this example. Before starting the procedure the test booklets should be prepared by first arranging them so that the speakers are in the same order for each listener. It is convenient, but not necessary, to arrange the speakers alphabetically and the listeners numerically. Listeners are identified by the last four digits of their social security account number. After arranging the booklets in the desired order the bindings should be removed so that the pages separate:

a. Turn the OMR on and press the feeder clear and reset buttons.

b. Run program XXX and follow instructions printed on the Decwriter. (See Figure 8.)

c. Enter date of test.

d. Enter up to 50 ASCII characters describing the system tested.

e. A disk write option is then selected. If a 1 is entered a disk file will be created. If 0 is entered no file is created. This option is useful for checking the OMR or forms alignment. See paragraph f below. Normal operation is to enter a 1.

f. A line printer output option is then selected. A 0 will cause no line printer output. A 1 will cause a printout to be made of the matrix of zeroes and ones for

each test booklet page. This option is selected when checking forms alignment and OMR operation. Normal procedure is to enter a 0.

g. Follow instructions for entering the number of listeners and speakers and the system identification number.

h. Follow instructions for entering the word list key and speaker identification. This has been added to eliminate the need for the listeners to blacken in the rectangles on their test booklets corresponding to this information. They should continue to write this information in the large boxes to the left of the rectangles.

i. After entering all word list keys and speakers they will be typed out on the Decwriter for verification. Carefully check their accuracy. If there is an error start over by aborting XXX. This is accomplished by typing in C while holding the CRTL key down followed by ABORTXXX after the MCR prompt. If the word list keys and speakers are correct type in RESUME followed by a carriage return.

j. At this time the pages are manually fed into the OMR. Each page should be placed face down on the glass platen with the header end of the page against the paper gate. After the page is read it is removed from the platen and the next page placed in position. This process is repeated until all pages are read. After the last page is read a blank page (could use reverse side of last page) is placed on the platen and read. This will cause the program to pause.

k. After the pause, if more pages are to be read enter a 0. If the scoring run is complete enter a 1. A printout of "bad marks" is made on the Decwriter. These numbers are the number of listener responses not read by the OMR for each listener. This information is used when training new listeners to master the technique of using the markers and to detect OMR read problems. After this printout, XXX stops.

l. Various error conditions can occur while reading pages in. These may be due to the pages being read in the wrong order, a page not properly aligned over the glass platen, or a page read in twice. Error messages are printed on the Decwriter for each of these conditions. Simply correct the problem and type in RESUME.

m. The next step in the process is to execute XFER. Run XFER in the usual way (see Figure 8) and follow instructions.

n. The final step is the actual scoring. Run SCORE and follow instructions. Be sure the line printer is on-line. The result will be a disk file called FOR006 DAT containing the scored DRT results. Output this file to the line printer using PIP to obtain hardcopies.

```

* RUN DF:XXX
ENTER DATE OF TEST DD-MMM-YY (15-NOV-77) :21 MAR 78
THIS IS WHAT YOU SAID... 21 MAR 78

* ENTER HEADER INFO...AS0
* DRT SCORING EXAMPLE

***COPY TO DISK?..TYPE 0 FOR NO, 1 FOR YES
* 1

***COPY TO PRINTER?..TYPE 0 FOR NO; 1 FOR YES
* 0

ENTER #LISTENERS,#SPEAKERS,#SYSTEM..I2I2I4
FOR EXAMPLE:08061104 FOLLOWED BY CARRIAGE RETURN
* 01011000
ENTER KEY AND SPEAKER (E.G.:102BBV) FOR SPEAKER 1
* 304BBV

CHECK THE KEYS...

304BBV
TTO -- PAUSE ***** READY TO GO *****

* >RES
>
EOF. ENTER 0 TO GO OR 1 TO STOP
* 1

BAD MARKS,MARKS % ...      1.    232.    0.4
****SYSTEM # 1000
LISTENER 1277      0 ERRORS  % 0.0
00000 00000 00000 00000 00000 00000 00000 00300 00000 0000
TTO -- STOP *** FINISHED ***
>

* RUN DF:XFER

ENTER SYSTEM ID ...I4
* 1000

21 MAR 78 DRT SCORING EXAMPLE

HOW MANY LISTENERS TO DELETE?..I2
* 0

HOW MANY SPEAKERS TO DELETE?..I2
* 0

ENTER ANY INCORRECT-CORRECTED KEY PAIR (0 IF OK)
* 0
TTO -- STOP
>

```

Figure 8. Sample Decwriter Output During DRT Scoring on PDP-11

SYSTEM TESTED: 1000 21 MAR 78 DRT SCORING EXAMPLE

NUMBER LISTENERS = 1  
NUMBER SPEAKERS = 1

\*\*\*\*\*  
FOR LISTENER: 1277 \*  
\*\*\*\*\*

SPKR SCORE  
BY DR.82

MAIN ATTRIBUTE	PRESENT		ABSENT		TOTAL	
	MEAN	S.E.	MEAN	S.E.	MEAN	S.E.
VOICING	100.00	0.00	75.00	0.00	87.50	0.00
FRICITIONAL	100.00	0.00	75.00	0.00	87.50	0.00
NON-FRICITIONAL	100.00	0.00	75.00	0.00	87.50	0.00
NASALITY	100.00	0.00	100.00	0.00	100.00	0.00
GRAVE	100.00	0.00	100.00	0.00	100.00	0.00
ACUTE	100.00	0.00	100.00	0.00	100.00	0.00
SUSTENTION	100.00	0.00	87.50	0.00	93.75	0.00
VOICED	100.00	0.00	75.00	0.00	87.50	0.00
UNVOICED	100.00	0.00	100.00	0.00	100.00	0.00
SIBILATION	87.50	0.00	100.00	0.00	93.75	0.00
VOICED	75.00	0.00	100.00	0.00	87.50	0.00
UNVOICED	100.00	0.00	100.00	0.00	100.00	0.00
GRAVENESS	87.50	0.00	75.00	0.00	81.25	0.00
VOICED	75.00	0.00	100.00	0.00	87.50	0.00
UNVOICED	100.00	0.00	50.00	0.00	75.00	0.00
COMPACTNESS	100.00	0.00	75.00	0.00	87.50	0.00
VOICED	100.00	0.00	100.00	0.00	100.00	0.00
UNVOICED	100.00	0.00	50.00	0.00	75.00	0.00
TOTALS	95.83	0.00	85.42	0.00	90.62	0.00

\*\*\*\*\*  
\* MEAN = 90.62 \*  
\* TOTAL DRT SCORE: \*  
\* S.E. = 0.00 \*  
\*\*\*\*\*

Figure 9. Sample Printout Resulting From DRT Scoring on PDP-11

SYSTEM TESTED: 1988 21 MAR 78 DRT SCORING EXAMPLE

NUMBER LISTENERS = 1  
NUMBER SPEAKERS = 1

\*\*\*\*\*  
FOR SPEAKER: BV \*  
\*\*\*\*\*

LISTENER SCORE  
1277 98.62

MAIN ATTRIBUTE	PRESENT		ABSENT		TOTAL	
	MEAN	S.E.	MEAN	S.E.	MEAN	S.E.
VOICING	100.00	0.00	75.00	0.00	87.50	0.00
FRICITIONAL	100.00	0.00	75.00	0.00	87.50	0.00
NON-FRICITIONAL	100.00	0.00	75.00	0.00	87.50	0.00
NASALITY	100.00	0.00	100.00	0.00	100.00	0.00
GRAVE	100.00	0.00	100.00	0.00	100.00	0.00
ACUTE	100.00	0.00	100.00	0.00	100.00	0.00
SUSTENTION	100.00	0.00	87.50	0.00	93.75	0.00
VOICED	100.00	0.00	75.00	0.00	87.50	0.00
UNVOICED	100.00	0.00	100.00	0.00	100.00	0.00
SIBILATION	87.50	0.00	100.00	0.00	93.75	0.00
VOICED	75.00	0.00	100.00	0.00	87.50	0.00
UNVOICED	100.00	0.00	100.00	0.00	100.00	0.00
GRAVENESS	87.50	0.00	75.00	0.00	81.25	0.00
VOICED	75.00	0.00	100.00	0.00	87.50	0.00
UNVOICED	100.00	0.00	50.00	0.00	75.00	0.00
COMPACTNESS	100.00	0.00	75.00	0.00	87.50	0.00
VOICED	100.00	0.00	100.00	0.00	100.00	0.00
UNVOICED	100.00	0.00	50.00	0.00	75.00	0.00
TOTALS	95.62	0.00	68.42	0.00	90.62	0.00

\*\*\*\*\*  
\* MEAN = 90.62 \*  
TOTAL DRT SCORE: \*  
\* S.E. = 0.00 \*  
\*\*\*\*\*

Figure 9. Sample Printout Resulting From DRT Scoring on PDP-11 (Cont)

SYSTEM TESTED: 1 MAR 21 MAR 78 DRT SCORING EXAMPLE

NUMBER LISTENERS = 1  
NUMBER SPEAKERS = 1

COMBINED RESULTS - STANDARD ERRORS ACROSS SPEAKERS AND LISTENERS \*\*\*\*\*

MAIN ATTRIBUTE:	PRESENT		ABSENT		TOTAL	
	MEAN	S.E.	MEAN	S.E.	MEAN	S.E.
VOICING	100.00	0.00	75.00	0.00	87.50	0.00
FRICITIONAL	100.00	0.00	75.00	0.00	87.50	0.00
NON-FRICITIONAL	100.00	0.00	75.00	0.00	87.50	0.00
NASALITY	100.00	0.00	100.00	0.00	100.00	0.00
GRAVE	100.00	0.00	100.00	0.00	100.00	0.00
ACUTE	100.00	0.00	100.00	0.00	100.00	0.00
SUSTENTION	100.00	0.00	87.50	0.00	93.75	0.00
VOICED	100.00	0.00	75.00	0.00	87.50	0.00
UNVOICED	100.00	0.00	100.00	0.00	100.00	0.00
SIBILATION	87.50	0.00	100.00	0.00	93.75	0.00
VOICED	75.00	0.00	100.00	0.00	87.50	0.00
UNVOICED	100.00	0.00	100.00	0.00	100.00	0.00
GRAYENESS	87.50	0.00	75.00	0.00	81.25	0.00
VOICED	75.00	0.00	100.00	0.00	87.50	0.00
UNVOICED	100.00	0.00	50.00	0.00	75.00	0.00
COMPACTNESS	100.00	0.00	75.00	0.00	87.50	0.00
VOICED	100.00	0.00	100.00	0.00	100.00	0.00
UNVOICED	100.00	0.00	50.00	0.00	75.00	0.00
TOTALS	98.00	0.00	85.42	0.00	90.62	0.00
*****						
* MEAN = 90.62 *						
* S.E. = 0.00 *						
*****						

BY

MEAN 90.62  
S.E. 0.00

Figure 9. Sample Printout Resulting From DRT Scoring on PDP-11 (Cont)

SYSTEM 1000 01 MAR 78 DRT SCORING EXAMPLE

NUMBER LISTENERS = 1  
NUMBER SPEAKERS = 1

SPEAKERS

BV  
LIST.

1277 98.62 98.62 0.00

MEAN 98.62

S.E. 0.00

\*\*\*\*\*  
\* MEAN = 98.62 \*  
TOTAL DRT SCORE! \*  
\* S.E. = 0.00 \*  
\*\*\*\*\*

Figure 9. Sample Printout Resulting From DRT Scoring on PDP-11 (Cont)

#### **4.3 Listeners**

##### **4.3.1 LISTENER BEHAVIORAL CONTROLS**

A study was made to determine those controls required to minimize the effects of listener behavior on the DRTs conducted in-house. The study included a search of the applicable literature and a personal interview with Dr. W. D. Votors, one of the creators of the DRT. A report of this study is included as Appendix D. In addition, a committee was formed to make a determination as to the applicability of AFR 80-33, Use of Volunteers in Aerospace Research to the in-house DRT program. The committee found that the provisions of AFR 80-33 do not apply. A report of these findings is on file at the COMSEC Engineering Office.

##### **4.3.2 RECRUITING**

Listeners were recruited by advertising in local newspapers during November 1976. Over one hundred responses were received. Initial screening was accomplished by administering a pure tone audiometric test as was done during the trial period earlier in the year. Those who did not pass the test were not considered for the job. The nature of the work was explained to each application. They were offered \$2.50 per hour for one-half day (4-1/2 hours) per week with the understanding that they must successfully complete a training period and that they were subject to removal from the program at any time if their performance was not consistent and reliable. The first eighteen that qualified and were willing entered a training program. Approximately 50 names were retained on a backup list. Since then the 50 names have been exhausted to replace listeners (many did not want the job when called back several weeks later). On one other occasion an advertisement in the newspaper was used again to recruit listeners. Other than that one time, word of mouth through the listening crew has been adequate to recruit replacement listeners.

##### **4.3.3 TRAINING**

A training program consisting of four sessions, each four and one-half hours in length, was conducted during December 1976. Of the eighteen listeners who started the program, three quit after the first session, two after the second session, and four were not accepted for the job after the fourth session. The remaining nine stayed on as part of the listening crew. A second training period consisting of three sessions, each four and one-half hours in length, was conducted in January 1977. Five candidates from the backup list participated. Two quit after the second session, the remaining three became part of the listening crew. Of the twelve who were selected four are still part of the listening crew after one year. The remaining eight quit at various times. The first left after 22 weeks. The mean length of time these eight listeners stayed on the crew was 30 weeks. Replacements were recruited and trained as required.

#### 4.3.3.1 Training Material

Training material consisted of repeated applications of two three-speaker DRTs that had been processed by two different narrowband vocoders. The two DRTs were administered 13 times during the December training program. Fifteen single speaker tests were administered the first session and 21 on each of the remaining sessions. After three sessions it was clear which listeners would not be selected, therefore, the January training program consisted of only three sessions. The same training material was used. Fifteen single speaker tests were administered during the first session and 21 the second and third sessions. The speakers were heard repeatedly in the order: BV JE RD BL SN CH. The first three speakers had been processed by a tenth order Linear Predictive Vocoder (LPC)<sup>6</sup> at a 3.6 kbps data rate, the last three by TRIVOC (4-14)<sup>7</sup> at 2.4 kbps. These DRTs had been previously evaluated by Dynastat. Table 11 contains the mean DRT scores and standard deviations obtained by Dynastat for each of the systems used during the training.

Table 11. DRT Scores Obtained by Dynastat for the Test Material Used During In-house Training Program in December 1976 and January 1977

System	Speaker	Mean	Standard Deviation*
1104 (LPC)	BV	86.1	2.80
	JE	84.6	1.53
	RD	89.7	1.32
2003 (TRIVOC)	BL	87.2	1.61
	SN	86.8	2.88
	CH	95.2	1.64

\*Standard deviations were computed from furnished standard errors using the formula

$$\text{Standard Deviation} = \frac{\text{Standard Error}}{\sqrt{N-1}}$$

where

N = number of listeners.

6. Wiggins, R. H. (1976) Narrowband Digital Voice Processing (CSP-30 LPC Software Documentation), Volume I, ESD-TR-76-282.
7. Roberts, J. E., Smith, C. P., and Wiggins, R. H. (1975) Triple-function voice coder (TRIVOC), J. Acous. Soc. Am., 57 Suppl. J:535.

#### 4.3.3.2 Training Results

Time and space does not permit complete exposure of the results for every listener who entered the training program in this report. Three listeners were randomly selected to illustrate the kinds of results obtained during the training. Listener 3299 participated in the December 1976 training period and was not selected to continue in the program. Table 12a contains a summary of all DRT scores achieved by this listener. Listener 5699 also participated in the December training. This listener's scores are contained in Table 12b. Listener 5699 was selected to continue in the program and remained with the listening crew for 25 weeks. Listener 9557 was a member of the January training group. Scores for this listener are contained in Table 12c. Listener 9557 was selected and continues to be a member of the crew after 14 months. Tables 12a, b, and c also contain entries for the last two training sessions which are the number of standard deviations the listeners' DRT scores are from the Dynastat scores. These entries are based on the data in Table 11. Table 13a is a summary of the number of times each listeners' score was two or more standard deviations below Dynastat. Table 13b is a summary of the number of times each listeners' score was three or more standard deviations below Dynastat. Over half the time listener 3299 scored more than three standard deviations below Dynastat. In addition, this listener did not perform consistently as can be observed in Table 12a. For these reasons listener 3299 was not retained. Listener 5699 was above three standard deviations below Dynastat over 80 percent of the time. Listener 9557, after only three training sessions, scored above three standard deviations below Dynastat over 70 percent of the time. Both of these listeners scored above Dynastat on several occasions. In addition, except for an occasional "outlier", both of these listeners were consistent. These two listeners were selected to continue. These results are representative of all who participated in both the December and January training periods. Those who were eliminated from the program performed as did listener 3299. Those who were selected performed in a similar manner as listeners 5699 and 9557.

Table 12a. Training History for Listener 3299. Top number is DRT score.  
 Bottom number (for last two sessions only) is number of standard deviations  
 listener score is from Dynastat score

Speaker	REPITITION NUMBER												
	1	2	3	4	5	6	7	8	9	10	11	12	13
BV	61.5	71.9	74.0	74.0	71.9	70.8	78.1 -2.36	76.0 -3.61	70.1 -2.86	68.8 -6.18	77.1 -3.21	77.1 -3.21	80.2 -2.11
JE	68.8	74.0	79.2	70.8	76.0	78.1	78.1 -4.25	82.3 -1.50	79.2 -3.53	85.4 +0.52	83.3 -0.85	76.0 -5.62	81.3 -2.16
RD	80.2	78.1	78.1	77.1	82.3	79.2	83.3 -4.85	86.5 -2.42	84.4 -4.02	85.4 -3.26	83.3 -4.85	87.5 -1.67	88.5 -0.91
BL	69.8	69.8	71.9	80.2	83.3	78.1	74.0 -8.20	75.0 -7.58	83.3 -2.42	77.1 -6.27	85.4 -1.12	79.2 -4.97	83.3 -2.42
SN	68.8	76.0	69.8	81.3	76.0	74.0	81.3 -1.91	78.1 +3.02	80.2 -2.29	82.3 -1.56	82.3 -1.56	77.1 -3.36	79.2 -2.64
CH	90.6	85.4	83.3	89.6	87.5	84.4	88.5 -4.09	87.5 -4.70	89.6 -3.41	93.8 -0.85	86.5 -5.30	88.5 -4.09	86.5 -5.30
	2 December			9 December			16 December			20 December			

Table 12b. Training History for Listener 5699. Top number is DRT score.  
 Bottom number (for last two sessions only) is number of standard deviations  
 listener score is from Dynastat score

Speaker	REPITITION NUMBER												
	1	2	3	4	5	6	7	8	9	10	11	12	13
BV	71.9	83.3	81.3	82.3	82.3	82.3	81.3 -1.71	82.3 -1.36	85.4 -0.25	82.3 -1.36	80.2 -2.11	87.5 +0.50	85.4 -0.25
JE	76.0	78.1	79.2	78.1	81.3	78.1	80.2 -2.88	83.3 -0.85	74.0 -6.93	81.3 -2.16	77.1 -4.90	79.2 -3.53	79.2 -3.53
RD	89.6	86.5	90.6	91.7	88.5	87.5	87.5 -1.67	90.6 +0.68	92.7 +2.27	88.5 -0.91	90.6 +0.68	92.7 +2.27	90.6 +0.68
BL	84.4	86.5	86.5	86.5	85.4	82.3	84.4 -1.74	85.4 -1.12	83.3 -2.42	87.5 +0.19	84.4 -1.74	86.5 -0.43	84.4 -1.74
SN	74.0	77.1	75.0	81.3	81.3	76.0	81.3 -1.91	83.3 -1.22	81.3 -1.91	79.2 -2.64	81.3 -1.91	77.1 -3.37	84.4 -0.83
CH	88.5	95.8	91.7	90.6	94.8	87.5	93.8 -0.85	88.5 -4.09	88.5 -4.09	90.6 -2.80	90.6 -2.80	92.7 -1.52	94.8 -0.24
	2 December			9 December			16 December			20 December			

Table 12c. Training History for Listener 9557. Top number is DRT score. Bottom number (for last two sessions only) is number of standard deviations listener score is from Dynastat score

Speaker	REPETITION NUMBER									
	1	2	3	4	5	6	7	8	9	10
BV	67.7	83.3	78.1	83.3 +1.00	88.5 +0.86	87.5 +0.50	84.4 -0.61	83.3 -1.00	80.2 -2.11	82.3 -1.36
JE	71.9	83.3	83.3	77.1 -4.90	82.3 -1.50	81.3 -2.16	83.3 -0.85	82.3 -1.50	79.2 -3.53	82.3 -1.50
RD	78.1	90.6	86.5	91.7 +1.52	89.6 -0.08	94.8 +3.86	92.7 +2.27	91.7 +1.52	88.5 -0.91	93.8 +3.11
BL	72.9	82.3	77.1 -6.27	81.3 -3.66	85.4 -1.12	81.3 -3.60	82.3 -3.04	79.2 -4.97	83.3 -2.12	
SN	61.3	83.3	71.9 -5.18	79.2 -2.64	81.3 -1.91	83.3 -1.22	81.3 -1.91	78.1 -3.02	83.3 -1.22	
CH	87.5	93.8	89.6 -3.41	91.7 -2.13	91.7 -2.13	91.7 -2.13	81.3 -8.48	89.6 -3.41	91.7 -2.13	
	6 January		13 January			20 January				

Table 13a. Number of Times  
Listeners' Score Was Two or  
More Standard Deviations Below  
Dynastat Score (last two sessions  
only)

Speaker	Listener		
	3299	5699	9557
BV	7	1	1
JE	4	6	3
RD	5	0	0
BL	6	1	6
SN	4	2	3
CH	6	4	7
Total	32 (76%)	14 (33%)	20 (48%)

Table 13b. Number of Times  
Listeners' Score Was Three or  
More Standard Deviations Below  
Dynastat Score (last two sessions  
only)

Speaker	Listener		
	3299	5699	9557
BV	4	0	0
JE	3	4	2
RD	4	0	0
BL	4	0	5
SN	2	1	2
CH	6	2	3
Total	23 (55%)	7 (17%)	12 (29%)

## 5. PERFORMANCE OF IN-HOUSE DRTs

As discussed earlier in this report, it is essential that DRT scores be repeatable for a successful in-house program. In addition, it is desirable that in-house DRT scores be comparable to Dynastat scores. Results obtained over the first 12 months of the in-house program indicate that both repeatability and comparability have been achieved.

### 5.1 Listener Elimination

Normally a DRT is administered to 10 or 12 listeners. However, it is likely that one or two of them are trainees and one or two may not be performing up to their normal standard. Therefore a screening process is used to eliminate listeners from a given scoring run. The number of listeners is reduced to eight for each scoring run. This is the number that Dynastat uses. The elimination procedure used has been developed to improve the consistency of the listeners as a group by eliminating outliers. Let  $L$  = number of listeners and  $s$  = number of speakers for a particular DRT. Suppose  $X_{ij}$  is the  $i$ th listeners' DRT score for speaker  $j$  where  $i = 1, \dots, L$  and  $j = 1, \dots, s$ . We compute the mean DRT score for each speaker  $j$ .

$$\bar{X}^* j = \frac{1}{L} \sum_{i=1}^L X_{ij}, \quad j = 1, \dots, s.$$

We then form a matrix whose elements  $D_{ij}$  are the differences between the  $i$ th listener's score for speaker  $j$  and the mean for speaker  $j$ . Thus,

$$D_{ij} = X_{ij} - \bar{X}^* j, \quad i = 1, \dots, L; \quad j = 1, \dots, s.$$

Those listeners who are performing at or near the mean for all speakers will have differences that are near zero. Those that perform exceptionally low or high for one or more speakers might be considered outliers. A measure based on the magnitude of these differences is used to eliminate the listener who is an outlier. The measure is

$$VAR_i = \frac{1}{s} \sum_{j=1}^s D_{ij}^2, \quad i = 1, \dots, L.$$

The listener having the largest  $VAR_i$  is eliminated from the scoring run.  $L$  is then reduced by one and the process is repeated by computing new speaker means and differences. Again  $VAR_i$  is computed for each listener and the next listener is eliminated. This procedure is repeated until only eight listeners remain. This

process allows for the possibility of very high scoring listeners to be eliminated. However, it has been our experience that only rarely is a high scoring listener eliminated.

### 5.2 Repeatability and Comparability

Every listening session is started by administering the same three-speaker DRT. We refer to this DRT as the probe. The probe was also used during the training periods in December 1976 and January 1977. It consists of the first three speakers from Table 11. The scores obtained by each listener for the probe is closely tracked in order to monitor the listeners' consistency. The mean score for the probe each week provides us a measure of repeatability as well as a comparison with Dynastat scores. Additionally, from time to time a particular DRT is administered to the listening crew a second or third time in order to measure repeatability. Figure 10 is a scatter diagram of mean DRT scores for the probe for 40 repetitions. Each point represents one administration of the test. The first test was given on 14 January 1977 and the last on 22 December 1977. Each mean is based on only eight listener scores. Elimination of listeners was accomplished as described in Section 5.1. Also included in the figure is a confidence interval for the mean based on a Dynastat score of 86.8 and standard error of 0.75 for these speakers. A rapid learning trend during the first four sessions is apparent in the figure. After that time the scores are rather consistent except for a drop after the 22nd repetition. This was a time when several new listeners were added to replace departing members of the crew. The low scores for repetition numbers 23, 29, and 35 can be explained by noting that a full listening crew was not available on those dates and trainees' scores are included in the mean. 95 percent confidence intervals for the mean DRT score in the range 88 to 90 are typically two to three points wide. Most of the scores reflected in Figure 10 are well within a three-point band. This indicates that the in-house listening crew performs consistently over time. In-house DRT scores are shown to be comparable with scores obtained by Dynastat in Table 14. Table 14 contains mean DRT scores and standard errors for those systems that have been tested at least three times using either in-house or Dynastat resources. A one-way classification analysis of variance<sup>4</sup> was performed on the scores for each system. No significant differences were found. This indicates that in-house and Dynastat DRT scores for the same system are essentially the same. Thus, direct statistical comparisons can be made using a mix of in-house and Dynastat DRT results.

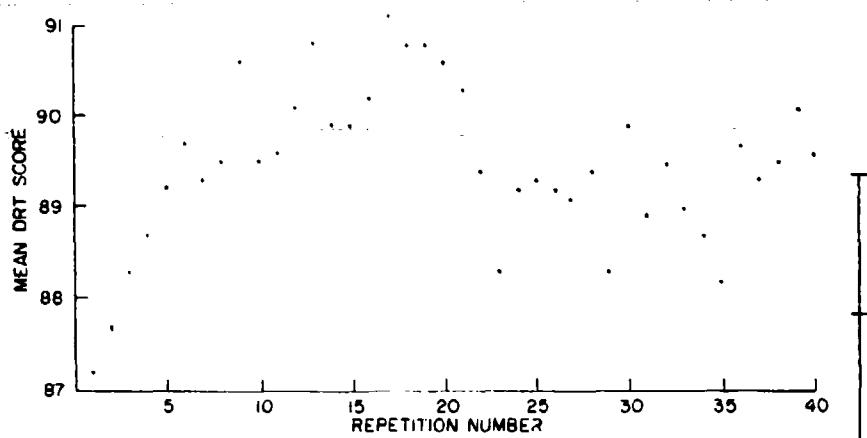


Figure 10. Mean DRT Scores for Probe After Eliminating Outlier Listeners

Table 14. In-House and Dynastat DRT Scores

SYSTEM ID	IN-HOUSE (MEAN/STANDARD ERROR) REPETITION			DYNASTAT (MEAN/STANDARD ERROR) REPETITION	
	1	2	3	1	2
2001	91.9/0.46			90.6/0.62	90.4/0.65
2012	87.5/0.46			85.0/0.93	85.9/0.51
2023	91.3/0.44	91.0/0.43		89.6/0.74	
2043	92.2/0.48	92.6/0.41		90.9/0.28	
2047	87.7/0.63	88.4/0.58		87.1/0.56	
2048	79.8/0.59	81.4/0.56	78.9/0.74	81.5/0.85	
2049	70.5/0.90	71.9/0.85		72.3/0.95	
2050	90.6/0.40	91.3/0.35		91.7/0.37	
2051	85.2/0.63	86.7/0.54		86.0/0.38	
2052	76.7/0.76	77.5/0.71	75.9/0.90	77.2/0.70	
2054	68.8/0.86	68.3/0.80		69.1/1.29	
2058	81.2/1.61	81.5/1.43		83.5/0.80	
2060	81.0/1.17	79.3/1.49		82.6/0.65	
2069	88.6/0.52	89.7/0.55	89.7/0.42	88.7/0.30	
2070	84.7/0.72	86.2/0.73		87.6/0.57	
2071	69.2/1.12	69.3/1.21		71.4/0.96	
2072	68.5/1.81	70.2/1.74		72.8/0.59	
2073	84.7/0.60	85.3/0.63		84.5/0.73	

## 6. COST

The weekly costs to conduct in-house DRTs are summarized below:

Listener salaries 12 listeners, 4-1/2 hours at \$3.00 per hour	\$162.00
Test booklets 252 booklets at \$.11 each	27.72
Test Administrator Salary 5 hours at approximately \$8.00 per hour	40.00
Scoring Cost: Scorer salary (6 hours at \$3.00 per hour)     \$18.00 Computer    No Charge	<u>18.00</u>
Total cost for three six-speaker DRTs:	\$247.72
Cost for one six-speaker DRT: In-house	\$82.85

The above in-house cost does not include development and implementation of the in-house capability. These additional costs, if apportioned over a 3-year period, would add less than \$50.00 to the cost of a single six-speaker DRT. Overhead costs have not been included in the above figures. Allowing for as much as 100 percent for overhead results in a final in-house cost for a six-speaker DRT that is significantly lower than that charged by a contractor. Sufficient demand exists to utilize the entire in-house capability of 150 six-speaker DRTs each year, thus realizing a large cost savings.

## 7. CONCLUSIONS AND RECOMMENDATIONS

It is concluded that the in-house DRT capability is a cost-effective means of providing a needed measure of voice communications intelligibility. It provides reliable data that is based on a widely accepted measure of intelligibility that is fast becoming a DoD Standard. It has been shown that the in-house testing provides results that are equivalent to those provided by contractor resources at a large cost savings. The in-house capability provides the additional advantage of rapid turnaround time, thus allowing decisions to be made in a timely fashion. The reduced unit cost of in-house DRTs allows us to perform the large number of DRTs required for our on-going algorithm development. Contractor costs for the number of DRTs required would be prohibitive. In addition to substantial cost savings and speedy turn-around, it is essential for the Government to have an in-house mechanism for validating results that might otherwise only be available from one, or very few other sources. This is particularly important in view of the decisions based on these results. It is recommended that the in-house capability be maintained.

It is a valuable resource that has widespread application throughout the Department of Defense. This capability could be expanded to serve the needs of other agencies requiring intelligibility testing and thus realize its maximum potential benefit. It is further recommended that continued use of contractor resources be made for conducting DRTs so that independent, unbiased results can be obtained at key points in our investigations. This will further serve to verify in-house results and provide a periodic comparison between in-house and contractor DRT scores.

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**Appendix A**

**Diagnostic Rhyme Test  
Word Lists**

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DIAGNOSTIC RHYME TEST

WORD LIST  
192A

PAGE 1

PAGE 2

PAGE 3

PAGE 4

BOB	COOT	TEST	PAN	BOB	TOOT	PEST	FAN
DAUNT	BOND	FAULT	CHOCK	TAUNT	POND	VAULT	JOCK
ROOT	MOAN	NEWS	DOE	HOOT	BONE	DUES	NOTE
CHEAT	BILL	VEE	THICK	SHEET	VILL	BEE	TICK
JAB	GUEST	THANK	CHAIR	GAB	JEEST	SANK	CARE
TOT	FOUGHT	MAD	DONG	POT	THOUGHT	ROD	SONG
BOAST	POOP	SHOW	YOU	HOST	COOP	SO	RUE
LIP	LEAP	RIO	REEK	RIP	REAP	LID	LEZK
SAID	VAST	DENSE	CALF	ZED	FAST	TENSE	GAFF
GNAW	KNOCK	BOSS	BOMB	DAH	DOCK	MOSS	MOM
CHOOSE	DOZE	FOO	THOUGHT	SHOES	THOSE	POOH	DOUGH
CHEEP	SING	THEE	GILT	KEEP	THING	ZEE	JILT
DANK	NET	FAD	PENT	BANK	MET	THAD	TENT
DOT	TAUGHTY	HOP	YAWL	GOT	CAUGHT	POP	WALL
LOAD	RUDE	ROW	LOOT	ROAD	LEHO	LOW	ROOT
TINT	BEAN	GIN	FEEL	DINT	PEEN	CHIN	VEAL
NECK	MAD	BEND	DAB	DECK	BAD	MENO	NAB
TMONG	VOX	CHAW	BON	TONG	BOX	SHAW	VON
CHOO	JOE	GOOSE	THOLE	COO	GO	JUICE	SOLE
WEED	BID	TEAK	THIN	REED	DID	PEEK	FIN
SAG	YEN	GAT	PEG	SHAG	WREN	BAT	XEO
ROT	RAW	LOCK	LONG	LOT	LAW	ROCK	WRONG
VOLE	SUE	COAT	DUNE	FOAL	ZOO	GOAT	TUNE
HIP	NEED	BIT	BEET	DIP	DEED	MIT	MEET
FENCE	DAN	OEN	SHAD	PENCE	THAN	TMEN	CHAO
SAW	CHOP	GAUZE	GOT	THAW	COP	JAWS	JOT
POOL	THOR	NOON	BOWL	TOOL	FORE	MOON	DOLE
YIELD	FIT	TEA	GILL	WIELD	HIT	KEY	DILL
LAP	LEST	RAMP	REND	RAP	REST	LAMP	LENO

DIAGNOSTIC RHYME TEST

WORD LIST  
1928

PAGE 1

BOB COOT PEST PAN BOB TOOT TEST FAN  
DAUNT POND FAULT JOCK TAUNT BOND VAULT CHOCK  
BODY MOAN NEWS DATE TICK SHEET BONE DUES NOTE  
CHEAT VILL GUEST THANK CHAIR GAR JEST SANK THICK  
JAB GUEST THOUGHT WAD BONG POT FOUGHT ROD CARE  
TOT THOUGHT WAD RUE ROAST POOP SHOW YOU  
GHOST COOP SO RID REEK RIP RFAP LIO LEEK  
LIP LEAP FAST DENSE GAFF ZED VAST TENSE CALF  
SAID FAIR DENSE DAPP GNAW ROCK BOSS MOM  
DAW KNOCK HOSS BRAH SHOES THOSE POOM DOUGH  
CHOOSE DOZE FOO THOUGH JILT CHEEP SING THEE GILT  
KEEP THING ZEE TENT DANK NET PAF PENT  
BANK MET THAD HOP WALL GOT TAUGHT FOF YAH  
DOT CAUGHT HOP ROOT ROAD RUDE LOH LOOT  
LOAD LEWD ROW VEAL TINT BEAN GIN FEEL  
DINT PEEN CHIN DAB NECK TONG BAD BEND NAB  
DECK MAD HEND DAB THOLE COO GO JUICE VON  
THONG VOX CHAW BRN REF ATO PEEK THIN  
CHOO JOE GOOSE TEAK PIN SHAG VEN BAT PEG  
WEED DID GAT WRONG TUNF VOLE SUE COAT DUMP  
SAG WREN LAW GOAT BEET HIP DEED BIT MEET  
ROT FOAL ZOO DAN DEN SHAD RAW CHOP GAUZE CHAO  
FOAL ZOO NFED MIT JAWS JAT TOOL FORE MOON GOT  
DIP FENCE DAN COP NOON BOWL YIELD HIT DALE  
THAW POOL THOR PIT KEY GILL LAP REST TEA DILL  
WIELD RAP LEST LAMP REND

PAGE 2

PEST PAN TAUNT BOND VAULT TEST FAN  
FAULT JOCK MOOT BONE DUES CHOCK  
NEWS DATE TICK GAR JEST SANK NOTE  
DATE TICK SHEET BONE DUES THICK  
THOUGHT WAD POT FOUGHT ROD CARE  
WAD RUE ROAST POOP SHOW YOU  
SO RID REEK RIP RFAP LIO LEEK  
RID REEK ZED VAST TENSE CALF  
DENSE GAFF GNAW ROCK BOSS MOM  
DAPP GNAW BRAH SHOES THOSE POOM DOUGH  
ZED VAST BRAH CHEEP SING THEE GILT  
TENT DANK GOT TAUGHT FOF PENT  
HOP WALL ROAD RUDE LOH LOOT  
ROW VEAL TINT BEAN GIN FEEL  
VEAL DAB NECK TONG BAD BEND NAB  
DAB NECK TONG COO GO JUICE VON  
HOP WALL ROAD RUDE LOH LOOT  
ROW VEAL TINT BEAN GIN FEEL  
WRONG TUNF VOLE SUE COAT DUMP  
GOAT BEET HIP DEED BIT MEET  
DAN DEN SHAD RAW CHOP GAUZE CHAO  
COP NOON BOWL TOOL FORE MOON GOT  
PIT KEY GILL YIELD HIT DALE  
LEST LAMP REND LAP REST TEA DILL

PAGE 3

BOB TOOT TEST FAN  
DAUNT BOND VAULT CHOCK  
BODY BONE DUES NOTE  
CHEAT GAR JEST SANK THICK  
JAB POT FOUGHT ROD CARE  
TOT RUE ROAST POOP SHOW YOU  
GHOST BRAH SHOES THOSE DOUGH  
LIP REEK RIP RFAP LIO LEEK  
SAID DAPP ZED VAST TENSE CALF  
DAW GNAW ROCK BOSS MOM  
CHOOSE BRAH SHOES THOSE POOM DOUGH  
KEEP JILT CHEEP SING THEE GILT  
BANK TENT DANK NET PAF PENT  
DOT CAUGHT HOP GOT TAUGHT FOF YAH  
LOAD ROW VEAL ROAD RUDE LOH LOOT  
DINT VEAL DAB NECK TONG BAD BEND NAB  
DECK HEND DAB THOLE COO GO JUICE VON  
THONG CHAW BRN REF ATO PEEK THIN  
CHOO JOE GOOSE TEAK PIN SHAG VEN BAT PEG  
WEED DID GAT WRONG TUNF VOLE SUE COAT DUMP  
SAG WREN LAW GOAT BEET HIP DEED BIT MEET  
ROT FOAL ZOO DAN DEN SHAD RAW CHOP GAUZE CHAO  
FOAL ZOO NFED MIT JAWS JAT TOOL FORE MOON GOT  
DIP FENCE DAN COP NOON BOWL YIELD HIT DALE  
THAW POOL THOR PIT KEY GILL LAP REST TEA DILL  
WIELD RAP LEST LAMP REND

PAGE 4

TEST FAN  
VAULT CHOCK  
DUES NOTE  
RFAP THICK  
SANK CARE  
ROD DONG  
SHOW YOU  
LIO LEEK  
TENSE CALF  
BOSS MOM  
POOM DOUGH  
THEE GILT  
PAF PENT  
FOF YAH  
LOH LOOT  
GIN FEEL  
BEND NAB  
SHAW VON  
JUICE SOLE  
PEEK THIN  
BAT PEG  
RAW ROCK  
COAT DUMP  
BIT MEET  
THEN CHAO  
GAUZE GOT  
MOON DALE  
TEA DILL  
REST LEND

## DIAGNOSTIC RHYME TEST

### WORD LIST 1934

PAGE 1

ROB      TOOT      PEST      FAN      ROB      COOT      TEST      PAN  
 TAUNT    POND      VAULT     JOCK     DAINT    BOND     FAULT    CHOCK  
 ROOT     MOAN      NEWS     DOTE    MOOT    BONE     DUE8    NOTE  
 CHEAT    VILL      VEE      TICK    SHEET   BILL     BEE    THICK  
 GAB     GUEST     SANK     CHAIR   JAR    JEST     THANK   CARE  
 TOT    THOLIGHT   WAD     BONG    POT    FOUGHT   ROD    DONG  
 BOAST   CROP      SHOW     RUE    GHOST   POOP     SO    YOU  
 LIP    REAP      RID     LEEK    RIP    LEAP     LID    REEK  
 ZED    FAST      TENSE    GAFF    SAID    VAST     DEN8F   CALF  
 GNAW   KNOCK     ROSS    BOMA    DAW    DOCK    MOSS    MOH  
 CHOOSE   THOSE    FOO    DOUGH   SHOES   DOZ8F   POOH   THOUGH  
 KEEP    SING     ZEF    GITL    CHEEP   THING   THEE   JILT  
 DANK    MET      FAN    TFNT    RANK    NET    THAC   PENT  
 DOT    CAUGHT    HOP    WALL    GOT    TAUGHT   POP    YAWL  
 LOAD    RUDE     ROW    LOOT    ROAD    LFEND   LOW    ROOT  
 TINT    PEEN     GIN    VEAL    DINT    BEAN    CHTN   FEEL  
 DECK    MAD      MEND    DAB    NECK    BAD    REND   NAB  
 THONG   BOX    CHAW    VON    TONG    VOX    SHAW   BON  
 COO    JOE    JUICEF    THOLF   CHOO    GO    GOOSE   SOLE  
 WEED   BIO    TEAK    THIN    HEFD    DID    PEEK    FISN  
 SAG    WREN    GAT    KFG    SHAG    YEN    BAT    PEG  
 LOT    RAW    ROCK    LONG    POT    LAW    LOCK   WRONG  
 VOLF   SUE    COAT    DUNF    FOAL    ZOO    GOAT   TUNE  
 RIP    NEED    HIT    BEET    NIP    DEED    BIT    MEET  
 PENCE   DAN    THEN    SHAD    FENCEP   THAN    DEN    CHAD  
 THAN   CHOP    JAWS    GOT    RAW    COP    GAUZE   JOY  
 TOOL   FORE    MOON    DOLE    POOL    THOR    NOON   BOWL  
 YIELD   HIT    TFA    OLL    WIELD   FIT    KEY    GILL  
 LAP    REST    RAMP    LEN8    RAP    LEST    LAMP   REND

PAGE 2

FAN      ROB      COOT      TEST      PAN  
 DAINT    BOND     FAULT    CHOCK  
 MOOT    BONE     DUE8    NOTE  
 SHEET   BILL     BEE    THICK  
 JAR    JEST     THANK   CARE  
 POT    FOUGHT   ROD    DONG  
 RUE    GHOST   POOP     SO    YOU  
 RIP    LEAP     LID    REEK  
 SAID    VAST     DEN8F   CALF  
 DAW    DOCK    MOSS    MOH  
 DOUGH   SHOES   DOZ8F   POOH   THOUGH  
 GITL    CHEEP   THING   THEE   JILT  
 TFNT    RANK    NET    THAC   PENT  
 WALL    GOT    TAUGHT   POP    YAWL  
 LOOT    ROAD    LFEND   LOW    ROOT  
 VEAL    DINT    BEAN    CHTN   FEEL  
 DAB    NECK    BAD    REND   NAB  
 VON    TONG    VOX    SHAW   BON  
 THOLF   CHOO    GO    GOOSE   SOLE  
 THIN    HEFD    DID    PEEK    FISN  
 KFG    SHAG    YEN    BAT    PEG  
 LONG    POT    LAW    LOCK   WRONG  
 DUNF    FOAL    ZOO    GOAT   TUNE  
 BEET    NIP    DEED    BIT    MEET  
 SHAD    FENCEP   THAN    DEN    CHAD  
 GOT    RAW    COP    GAUZE   JOY  
 DOLE    POOL    THOR    NOON   BOWL  
 OLL    WIELD    FIT    KEY    GILL  
 LEN8    RAP    LEST    LAMP   REND

PAGE 3

COOT      TEST      PAN  
 BOND     FAULT    CHOCK  
 DUE8    NOTE  
 BEE    THICK  
 THANK   CARE  
 ROD    DONG  
 SO    YOU  
 LID    REEK  
 DEN8F   CALF  
 MOSS    MOH  
 POOH   THOUGH  
 THEE   JILT  
 THAC   PENT  
 POP    YAWL  
 LOW    ROOT  
 CHTN   FEEL  
 REND   NAB  
 SHAW   BON  
 GOOSE   SOLE  
 PEEK    FISN  
 BAT    PEG  
 LOCK   WRONG  
 GOAT   TUNE  
 BIT    MEET  
 DEN    CHAD  
 GAUZE   JOY  
 NOON   BOWL  
 KEY    GILL  
 LAMP   REND

PAGE 4

TEST      PAN  
 FAULT    CHOCK  
 DUE8    NOTE  
 BEE    THICK  
 THANK   CARE  
 ROD    DONG  
 SO    YOU  
 LID    REEK  
 DEN8F   CALF  
 MOSS    MOH  
 POOH   THOUGH  
 THEE   JILT  
 THAC   PENT  
 POP    YAWL  
 LOW    ROOT  
 CHTN   FEEL  
 REND   NAB  
 SHAW   BON  
 GOOSE   SOLE  
 PEEK    FISN  
 BAT    PEG  
 LOCK   WRONG  
 GOAT   TUNE  
 BIT    MEET  
 DEN    CHAD  
 GAUZE   JOY  
 NOON   BOWL  
 KEY    GILL  
 LAMP   REND

DIAGNOSTIC RHYME TEST

WORD LIST  
1938

PAGE 1

BOR TAUNT ROOT CHEAT GAB POT ROAST RIP TED DAW SHOES KEEP RANK GOT ROAD TINT DECK TONG COO WEED SAG LOT FOAL DIP PENCE THAW POOL YIELD LAP

COOT POND BONE VILL GUEST THOUGHT COOP LEAP FAST KNOCK THORE THING MET CAUGHT LEWD BEAN MAD BOX JOE TEAK YEN RAW ROCK ZOO NEED DAN COP THOR HIT HIT LEST

PAGE 2

PEST VAULT NEWS VEF GUEST SANK ROD SHOW LID TENSE MOSS POOH ZEE FAD POP LOW GIN MEND JUICE OJO TEAK GAT ROCK GOAT HIT THEN JAN NOON TEA RAMP

PAN JACK NOTE TICK CHAIR BANG RUE REEK GAFF ROMA DOUGH JILT TENT WALL FEEL DAB VON THOLE PEG PEG REED SHAG LONG TIINE HFET SHAD JAT NOON TEA RAMP

DAUNT HOOT SHEET JAB TOT OHST LIP SAID GNAW CHOOSE CHEEP RANK NOT DINT NECK THONG CHOO PTN REED SHAG ROT VOLE NIP FENCE SAW TOOL DILL REND

MOAN BILL JEST FOUGHT POOP REAP VAST DOCK DOZE SING NET TAUGHT RUDE PEEN BAO VOX GO BID WREN LAW SUE DEED THAN CHOP FORE FIT REST

TOOT BOND JEST FOUGHT POOP REAP VAST DOCK DOZE SING NET TAUGHT RUDE PEEN BAO VOX GO BID WREN LAW SUE DEED THAN CHOP FORE FIT REST

TEST FAULT DUE'S BEE THANK MAD SO RID DENSE BOSS FOO THEE HOP ROW CHIN BEND CHAW GOOSE PEEK BAT LOCK COAT BIT DEN GAUZE MOON KEY LAMP

PAN CHOCK DOTE THICK CARE DONG YOU LEEK CALF MOM THOUGH GILT PENT YAWL LOOT VEAL NAB SON CHAD GOT DOLE BILL LEND

PAGE 3

BOB DAUNT MOAN BILL JEST FOUGHT POOP REAP VAST DOCK DOZE SING NET TAUGHT RUDE PEEN BAO VOX GO BID WREN LAW SUE DEED THAN CHOP FORE FIT REST

TEST FAULT DUE'S BEE THANK MAD SO RID DENSE BOSS FOO THEE HOP ROW CHIN BEND CHAW GOOSE PEEK BAT LOCK COAT BIT DEN GAUZE MOON KEY LAMP

PAGE 4

PAN CHOCK DOTE THICK CARE DONG YOU LEEK CALF MOM THOUGH GILT PENT YAWL LOOT VEAL NAB SON CHAD GOT DOLE BILL LEND

DIAGNOSTIC RHYME TEST

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194A

PAGE 1

BOB DAUNT POND MOOT SHEET SAB POT BOAST LIP SAID DAW SHOES KEEP BANK GOT LOAD TINT DECK THONG COO REED SHAG LOT FOAL NIP FENCE THAN POOL VIELD RAP

COOT POND BONE VILL JEST FOUGHT POOP REAP VAST DENSE MOSS THOSE SING MET TAUGHT RUDE PEEN MAD VOX GO BID WREN RAW SUE DEEO DAN CHOP FORE HIT REST

PAGE 2

TEST FAULT DIES VILL BANK ROD SHOW RID DENSE MOSS PROM ZING THAD POP ROW GIN HEND CHAN JUICE PEEK BAT \*OCK LOAT BIT DEN JAWS NOON TEA LAMP

PAN JOCK NOTE TICK CARE DONG YOU LEEK CALP MOM DOUGH GILT TENT YAWL LOOT VEAL DAB SON BOLF THIN KEG LONG DUNE MEET SHAD GOT DOLE DILL LEND

PAGE 3

BOB TAUNT BOOT CHEAT JAB TOT GHOST RIP ZED GNAW CHOOSE DINT NECK TONG CHOO WEED KEG ROT HEET SHAD GOT DOLLE DILL LEND

TOOT BOND MOAN BILL GUEST THOUGHT COOP LEAP FAST KNOCK DOZE THING NET CAUGHT ROAD LEWD BEAN BAD BOX JOE DIO RAG ROT VOLE DIP PENCE SAW TOOL WIELD LAP

PAGE 4

PEST VAULT NEWS VEE THANK MAD SO LEAP TENSE BOSS FOO THEE PAD HOP LOW CHIN BEND SHAW GOOSE TEAK YEN LAH ZOO NEED THAN COP THOR PIT LEST

FAN CHOCK OOTE THICK CHAIR BONG RUE REEK GAFF BOMB THOUGHT JILT PENT WALL ROOT FEEL NAB VON THOLE PIN PEG WRONG TUNE BEET CHAO JOT BOWL GILL RENO

DIAGNOSTIC RHYME TEST

WORD LIST  
1948

PAGE 1

ROB	TOOT
TAUNT	PONO
BOOT	BONE
CHEAT	VILL
GAB	GUEST
POT	FOUGHT
HOST	PROP
LIP	REAP
ZED	FAST
BAW	DOCK
CHOOSE	THOSE
KEEP	THING
BANK	NET
GOT	CAUGHT
ROAD	RUOR
TINT	BEAN
NECK	BAD
TONG	VOX
CHOO	JOE
REED	OIO
SAG	YEN
ROT	LAW
FOAL	ZOO
NIP	NEED
FENCE	THAN
THAW	COP
TOOL	FORE
YIELD	FIT
LAP	LEST

PAGE 2

PEST	FAN
VAULT	JOCK
NEWS	NOTE
VILL	VEE
GUEST	SANK
FOUGHT	ROD
PROP	SO
REAP	RIO
FAST	TENSE
DOCK	MOSS
THOSE	FOO
THING	ZEE
NET	THAD
CAUGHT	POP
RUOR	LOW
BEAN	GIN
BAD	BEND
VOX	SHAW
JOE	GOOSE
OIO	PEEK
YEN	GAT
LAW	LOCK
ZOO	GOAT
NEED	BIT
THAN	DEN
COP	JAWS
FORE	MOON
FIT	TEA
LEST	RAMP

PAGE 3

COOT	TEST
BONO	FAULTY
HOAN	QUES
BILL	SEE
JEST	THANK
TOT	WAD
ROAST	THONGHT
COOP	BHOW
LEAP	LIO
VAST	REEK
GNAW	DENSE
KNOCK	BOSS
DOZE	POOH
SING	THEE
MET	PAO
TAUGHT	HOP
LOAD	ROW
LEWDO	CHIN
PEEN	MENO
MAO	CHAW
BOX	JUICE
GO	SOLE
BID	TEAK
WREN	BAT
RAW	ROCK
SUE	COAT
DEEO	HIT
DAN	THEN
CHOP	GAUZE
THOR	NOON
HIT	KEY
REST	LAMP

PAGE 4

PAN	CHOCK
CHOCK	OOTE
THICK	CARE
WAD	SONG
BHOW	RUE
LIO	REEK
REEK	CALF
DENSE	BOMB
BOSS	THOUGH
POOH	GILT
THEE	TENT
PAO	YAWL
HOP	ROOT
ROW	CHIN
CHIN	VEAL
MENO	DAB
CHAW	VON
JUICE	SOLE
SOLE	THIN
TEAK	KEG
BAT	LONG
ROCK	DUNE
COAT	MEET
HIT	SHAO
THEN	GOT
GAUZE	BOWL
NOON	DILL
KEY	LEND
LAMP	

## DIAGNOSTIC RHYME TEST

WORD LIST  
1954

PAGE 1	PAGE 2	PAGE 3	PAGE 4				
GOB	COOT	TEST	PAN	ROB	TOOT	PEST	FAN
TAUNT	BOND	VAULT	CHOCK	DAUNT	POND	FAULT	JOCK
BOOT	BONE	NEWS	NOTE	HOOT	HOAN	DOES	DOTE
CHEAT	BILL	VEE	THICK	SHEET	VILL	BEE	TICK
JAB	JEST	THANK	CARE	GAR	GUEST	SANK	CHAIR
POT	FOUGHT	ROD	DOONG	TOT	THOUGHT	WAD	BONG
BOAST	POOP	SHON	YOU	HOST	COOP	SO	RUE
RIP	REAP	LID	LEEK	LIP	LEAP	RIO	REEK
SAID	VAST	DENSE	CALF	ZED	PAST	TENSE	GAFF
GHAW	DOCK	BOSS	MOM	DAW	KNOCK	MOSS	BOMB
CHOOSE	DOZE	FOO	THOUGH	SHOES	THOSE	POOH	DOUGH
KEEP	THING	ZEE	JILT	CHEEP	SING	THEE	GILT
BANK	NET	YHAD	PENT	DANK	MET	FAD	TENT
GOT	TAUGHT	POP	YAWL	NOT	CAUGHT	MOP	WALL
ROAD	RUDE	LOW	LOOT	LOAD	LEWD	ROW	ROOT
TINT	PEEN	GIN	VEAL	DINT	BEAN	CHIN	FEEL
NECK	BAD	BENO	NAB	DECK	NAO	MEND	DAB
THONG	BOX	CHAW	VON	TONG	VOX	SHAW	BON
COO	GO	JUICE	SOLE	CHOO	JOE	GOOSE	THOLE
WEED	BIO	TEAK	THIN	REC	OIO	PERK	FIN
BAG	YEN	GAT	PEG	SHAG	WREN	BAT	KEO
LOT	LAW	ROCK	WRONG	ROT	RAW	LOCK	LONG
FOAL	ZOO	GOAT	TUNF	VOLE	SUE	COAT	DUNE
NIP	NEED	BIT	BEET	DIP	DEEO	HIT	MEET
PENCE	DAN	THEN	SHAD	FENCE	THAN	DEN	CHAO
THAW	COP	JAWS	JOT	SAW	CHOP	GAUZE	GOT
POOL	THOR	NOON	BOWL	TOOL	FORE	MOON	DOLE
YIELD	PIT	TEA	GILL	WIELD	HIT	KEY	DILL
RAP	REST	LAMP	LEND	LAP	LEBT	RAKP	REND

DIAGNOSTIC RHYME TEST

WORD LIST  
1988

PAGE 1

GOB TAUNT MOOT CHEAT GAB TOT BOAST LIP SAID GNASH SHOES CHEEP DANK DOT ROAD DINT NECK THONG COO WEED SAG ROT VOLE DIP FENCE THAN CHAN POOL WIELD LAP

TOOT POND MOAN BILL GUEST FOUGHT POOP LEAP VAST DOCK THOSE SING MET CAUGHT RUDE PEEN BAD VOX GO DID YEN LAW ZOO NEED THAN CHOP FORE HIT LEST

PAGE 2

TEST VAULT DURE VEE BANK MAD SHON RID REEK DENSE CALF BOSS PONH THEE GILT FAD HOP LOW CHIN BEND CHAW JUICE TEAK GAT LOCK COAT MIT DEN JAWS NOON KEY RAMP

PAGE 3

BOB DAUNT DOTE THICK CHAIR ONG YOU RID REEK MOM DOUGH CHOOSE CHOOSE GILT TENT HALL VEAL NAB BON SOLE PIN PEG WRONG TUNE BEET CHAN GOT DOLE REND

PAGE 4

PEST FAULT NEWS BEE THANK ROD SO LID TENSE MOSS FOO ZEE THAD POP ROW GIN HEND SHAW VON GOOSE PEEK BAT ROCK LONG GOAT BIT THEN SHAD MOON TEA LAMP PAN CHOCK NOTE TICK CARE BONG RUE LEEK GAFF BOMB THOUGH JILT PENT YAWN ROOT FEEL DAB VON THOLE THIN KEG DUNE MEET SHAD JOY BOWL GILL LEND

DIAGNOSTIC RHYME TEST

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196A

PAGE 1

GOB  
TAUNT  
BOOT  
CHEAT  
JAB  
POT  
BOAST  
LIP  
SAID  
GNAW  
SHOES  
KEEP  
BANK  
DOT  
LOAD  
TINT  
NECK  
THONG  
COO  
WEED  
SAG  
LOT  
FOAL  
NIP  
FENCE  
THAW  
TOOL  
WIELD  
LAP

COOT  
BOND  
BONE  
BILL  
BUST  
THOUGHT  
COOP  
KIS.  
VAST  
DOCK  
THOSE  
THING  
MET  
CAUGHT  
LEWD  
BEAN  
MAD  
VOX  
GO  
DID  
HREN  
CAT  
LAW  
SUE  
NEED  
THAN  
COP  
THOR  
FYT  
LEST

PAGE 2

TEST  
VAULT  
NEWS  
VEE  
THANK  
ROD  
SHOW  
RID  
DENSE  
ROSS  
POOH  
ZEE  
THAO  
HOP  
ROW  
GIN  
BEND  
CHAN  
JUICE  
TEAK  
DAB  
CHAW  
SOLE  
FEEL  
DAB  
TENT  
WALL  
ROOT  
PEEL  
DAB  
BEND  
CHAW  
GO  
DID  
CAT  
ROCK  
GOAT  
BIT  
DEN  
JAWS  
MOON  
KEY  
RAEMP

PAGE 3

PAN  
CHOCK  
NOTE  
THICK  
CHAIR  
BONG  
RUE  
LEEK  
CALP  
ROSS  
DOUGH  
JILT  
THAO  
HOP  
ROW  
GIN  
TEAK  
DAB  
BON  
SOLE  
FEEL  
DAB  
TONG  
WALL  
ROOT  
PEEL  
DECK  
CHOO  
CHOO  
FIN  
KEG  
WRONG  
GOAT  
BIT  
DEN  
JAT  
MOON  
KEY  
REND

PAGE 4

TOOT  
POND  
HOAN  
SHEET  
GAB  
TOT  
GHOST  
RIP  
ZED  
HOM  
CHOOSE  
CHEEP  
DANK  
BOT  
RUDE  
DOZE  
SING  
NET  
TAUGHT  
ROAD  
DINT  
PEEN  
BAD  
BOX  
JOE  
BID  
REED  
SHAG  
ROT  
VOLE  
DIP  
DIP  
PENCE  
SAW  
POOL  
YIELD  
RAP

FAN  
JOCK  
DOTE  
TICK  
CARE  
DONG  
YOU  
REEK  
GAFF  
BOMB  
THOUGH  
GILT  
PENT  
YAWN  
LOOT  
CHIN  
MEND  
SHAW  
GOOSE  
PEEK  
BAT  
LOCK  
COAT  
HIT  
THEN  
GUAZE  
FORE  
NOON  
TEA  
LAMP

DIAGNOSTIC RHYME TEST

WORD LIST  
1968

PAGE 1

BOB      TOOT  
TAUNT    BOND  
BOOT     BONE  
SHEET    BILL  
GAB      JEST  
POT      THOUGHT  
GHOST    COOP  
RIP      REAP  
SAID     VAST  
DAN      DOCK  
CHOOSE   THOSE  
KEEP     THING  
DANK     NET  
DOT      CAUGHT  
ROAD     RUDE  
TINT     BEAN  
DECK     MAD  
TONG     VOX  
CHOO     GO  
WEED    BIO  
SHAG    WREN  
LOT      RAW  
VOLE    ZOO  
DIP      NEED  
FENCE   THAN  
SAW      CHOP  
POOL     THOR  
FIELD   HIT  
RAP      LEST

PAGE 2

PEST     FAN  
VAULT    CHOCK  
NEWS     NOTE  
BEE      THICK  
JEST     BANK  
THOUGHT   ROD  
COOP     SO  
REAP     LIO  
VAST     DENSE  
DOCK     MOSS  
THOSE    FOR  
THING    ZEE  
NET      FAD  
CAUGHT   HOP  
RUDE     LOW  
BEAN     GIN  
MAD      HEND  
VOX      SHAW  
GO       GOOSE  
TEAK     BAT  
WREN    RAW  
ZOO      COAT  
NEED     HIT  
THAN     DEN  
CHOP     GAUZE  
THOR     NOON  
HIT      KEY  
LEST     LAMP

PAGE 3

GOOT    DAUNT  
MOAN    NOOT  
CHEAT   JAB  
TOT    CARE  
BOAST   BONG  
RUE    RUE  
LEEK    CALF  
ZED    MOM  
DAUGH   SHAW  
JILT    JILT  
PENT    PENT  
WALL    WALL  
LOOT    LOOT  
PEEL    PEEL  
DAB    HEND  
SHON    SHAW  
SOLES   SOLE  
THIN    THIN  
KRG    KRG  
LONG    LONG  
TUNE    TUNE  
BEET    BEET  
CHAD    CHAD  
GOT    GOT  
BOWL    BOWL  
DILL    DILL  
REND    REND

PAGE 4

TEST    COOT  
FAULT   POND  
DUES    NOAN  
VEE    VILL  
FOUGHT   GUEST  
POOP    TOT  
LEAP    JAB  
FAST    FOUGHT  
KNOCK   FOOG  
DOZE    FOOG  
SING    COOT  
NET    COOT  
TAUGHT   COOT  
LEWD    LEAP  
PEEN    FAST  
BAO    KNOCK  
BOX    COOT  
JOE    COOT  
DIO    COOT  
YEN    COOT  
LAW    COOT  
SUE    COOT  
DEED    COOT  
DAN    COOT  
COP    COOT  
FORE    COOT  
FIT    COOT  
REBT    COOT

PAN    COOT  
JOCK   POND  
OTE    NOAN  
TICK   VILL  
CHAIR   GUEST  
DONG   TOT  
YOU    JAB  
REEK   FOOG  
GAPP   COOT  
BOMB   KNOCK  
THOUGH   FOOG  
TILT   COOT  
TENT   COOT  
YAML   COOT  
ROOT   LEAP  
VEAL   FAST  
NAB   KNOCK  
VON   COOT  
THOLE   COOT  
PIN   COOT  
PEG   COOT  
WRONG   COOT  
DUNE   COOT  
MEET   COOT  
SHAD   COOT  
JOT   COOT  
DOLE   COOT  
GILL   COOT  
LENO   COOT

DIAGNOSTIC RHYME TEST

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PAGE 1

GOD  
TAUNT  
MOOT  
SHEET  
GAB  
TOT  
GHOST  
LIP  
ZED  
SHAW  
CHOOSE  
CHEEP  
BANK  
DOT  
ROAD  
DINT  
NECK  
THONG  
CHOO  
REED  
SHAG  
ROT  
VOLE  
NIP  
PENCE  
SAW  
TOOL  
WIELD  
RAP

COOT  
BOND  
BONE  
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QUEST  
FOUGHT  
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FAST  
KNOCK  
THOSE  
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MET  
TAUGHT  
RUDE  
PEEN  
BAD  
VOX  
GO  
DID  
WREN  
LAH  
LOCK  
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DAN  
CHOP  
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TEST  
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BEND  
NAB  
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GOOSE  
PEEK  
BAT  
LOCK  
COAT  
BIT  
MEET  
THEN  
GAUZE  
MOON  
KEY  
LAMP

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BOR  
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DAW  
SHOES  
KEEP  
DANK  
GOT  
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DECK  
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WEED  
SAG  
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FOAL  
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YIELD  
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HOAN  
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POOP  
LEAP  
VAST  
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DOZE  
SING  
NET  
CAUGHT  
LEWD  
BEAN  
HAD  
BOX  
JOE  
BID  
YEN  
RAH  
SUE  
DIP  
NEED  
THAN  
COP  
THOR  
HIT  
LEST

PEST  
FAULT  
NEWS  
VEE  
THANK  
ROD  
SHOW  
LIO  
DENSE  
MOSS  
POOH  
ZEE  
FAD  
POP  
ROW  
WALL  
ROOT  
GIN  
MEND  
SHAW  
JUICE  
TEAK  
GAT  
ROCK  
GOAT  
HIT  
DEN  
JAWS  
NOON  
TEA  
RAMP

PAGE 2

PAGE 3

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DIAGNOSTIC RHYME TEST

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1978

PAGE 1

ROB	COOT
DAUNT	BOND
BOOT	BONE
SHEET	VILL
GAB	GUEST
TOT	FOUGHT
GHOST	POOP
RIP	REAP
SAID	VAST
CNAW	DOCK
SHOES	THOSE
KEEP	SING
BANK	NET
POT	CAUGHT
LOAD	RUDE
TINT	BEAN
NECK	MAD
TONG	BOX
COO	GO
REED	DID
SAG	WREN
LOT	RAW
FOAL	ZOO
DIP	DEED
FENCE	THAN
THAW	CHOP
TOOL	THOR
YIELD	PIT
RAP	REST

PAGE 2

PEST	PAN
FAULT	CHOCK
NEWS	NOTE
VILL	TICK
GUEST	SANK
FOUGHT	WAD
POOP	SO
REAP	LID
VAST	DENSE
DOCK	BOSS
THOSE	POOH
SING	ZEE
NET	THAD
CAUGHT	HOP
RUDE	ROW
BEAN	GIN
MAD	BEND
BOX	SHAW
GO	JUICE
DID	PEEK
WREN	GAT
RAW	ROCK
ZOO	GOAT
DEED	HIT
THAN	DEN
CHOP	JAWS
THOR	MOON
PIT	TEA
REST	LAMP

PAGE 3

TAUNT	TOOT
HOOT	POND
NOTE	MOAN
TICK	CHEAT
SANK	CHAIR
WAD	DOING
SO	YOU
LID	LEEK
DENSE	CALF
BOSS	MOM
POOH	DOUGH
ZEE	GILT
THAD	PENT
HOP	WALL
ROW	LOOT
GIN	FEEL
BEND	DAB
SHAW	VON
JUICE	SOLE
PEEK	FIN
GAT	KEG
ROCK	LONG
GOAT	TUNE
HIT	MEET
DEN	CHAN
JAWS	GOT
MOON	BOWL
TEA	OILL
LAMP	LEND

PAGE 4

TEST	PAN
Vault	JOCK
DUES	DOZE
VEE	THICK
THANK	CARE
ROD	SONG
SHOW	RUE
RID	REEK
TENSE	GAPP
MOSS	BOMB
POO	THOUGH
THEE	JILT
FAD	TENT
POP	VAWL
LOW	ROOT
CHIN	VEAL
MEND	NAB
CHAN	BON
GOOSE	THOLE
TEAK	THIN
BAT	PEG
LOCK	WRONG
COAT	DUNE
BIT	BEET
THEN	SHAD
COP	JOT
FORE	DOLZ
HIT	KEY
LEST	REND

DIAGNOSTIC RHYME TEST

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1984

PAGE 1

BOB  
DAUNT  
HOOT  
SHEET  
GAB  
TOT  
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FOUGHT  
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TAUGHT  
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PEEN  
MAD  
VOX  
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WREN  
LAH  
ZOO  
NEED  
THAN  
COP  
THOR  
FIT  
REST

PAGE 2

PEST  
FAULT  
DUES  
BRE  
JEST  
BANK  
WAD  
SHOW  
RID  
DENSE  
DOSS  
POOH  
THEE  
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JUICE  
PEEK  
BAT  
ROCK  
GOAT  
HIT  
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DEN  
JAWS  
MOON  
KEY  
RAMP

PAGE 3

FAN  
JOCK  
NOTE  
TICK  
CARE  
DONG  
YOU  
LEEK  
GAFF  
MOM  
THOUGH  
GILT  
PENT  
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ROOT  
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PAGE 4

COOT  
TAUNT  
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BAUZE  
NOON  
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LAMP

## DIAGNOSTIC RHYME TEST

### WORD LIST 1968

PAGE 1

BOB      COOT      TEST      PAN      BOB      TOOT      PEST      FAN  
 DAUNT    BOND      FAULT     CHOCK    TAUNT    PONO      VAULT    JOCK  
 BOOT     BONE      NEWS      NOTE     MOOT     MOAN      DUES     DOTE  
 CHEAT    BILL      VER      THICK    SHEET    VILL      BEE     TICK  
 JAB     GUEST      THANK     CHAIR    GAR     JEST      BANK    CARE  
 POT    FOUGHT      ROD      DONG    TOT     THOUGHT    WAD    BONG  
 GHOST    COOP      SO      RUE     BOAST    POOP      SHOW    YOU  
 RIP     LEAP      LID      REEK    LIP     REAP      RIO    LEEK  
 SAID    VAST      DENSE    CALF    ZED     FAST      TENSE    GAFF  
 DAW    KNOCK      HOSS    BOMB    GNAW    DOCK      BOSS    NOM  
 SHOES    DOZE      POOH    THOUGH    CHOOSE    THOSE    POO    DOUGH  
 CHEEP    BING      THEE    GILT    KEEP     THING    ZEE    JILT  
 DANK    NET      FAD    PENT    BANK     MET     THAD    TENT  
 DOT    TAUGHT    HOP    YAWL    ROT     CAUGHT    POP    WALL  
 LOAD    LEMO      ROW    ROOT    ROAD    RUDE    LOW    LOOT  
 DINT    BEAN      CHIN    FEEL    TINT    PEEN    GIN    VEAL  
 NECK    BAD      BEND    NAB    DECK    MAD    MEND    DAB  
 TONG    BOX      SHAW    VON    THONG    VOX    CHAW    BON  
 COO    CO      JUICE    SOLE    CHOO    JOE    GOOSE    THOLE  
 REED    BTO      PEEK    THIN    WEED    DID    TEAK    FIN  
 SAB    WREN      GAT    KEG    SHAG    YEN    BAT    PEG  
 ROT    RAH      LOCK    LONG    LOT    LAW    ROCK    WRONG  
 VOLE    SUE      COAT    DUNE    FOAL    ZOO    GOAT    TUNE  
 DIP    NEED      HIT    BEET    NIP    DEED    BIT    MEET  
 FENCE    THAN    DEN    CHAO    PENCE    DAN    THEN    SHAD  
 SAW    COP      GAUZE    JOY    THAW    CHOP    JAWS    GOT  
 TOOL    THOR    MOON    BOWL    POOL    FORE    NOON    DOLE  
 WIELD    HIT    KEY    DILL    YIELD    FIT    TEA    GILL  
 RAP    REST      LAMP    LENO    LAP    LEST    RAMP    REND

PAGE 2

TEST      PAN      BOB      TOOT      PEST      FAN  
 CHOCK    NOTE    MOOT     MOAN      VAULT    JOCK  
 VER      THICK    SHEET    VILL      DUES     DOTE  
 THANK    CHAIR    GAR     JEST      BEE     TICK  
 ROD      DONG    TOT     THOUGHT    BANK    CARE  
 RUE     REEK    BOAST    POOP      WAD    BONG  
 LID    REEK    LIP     REAP      SHOW    YOU  
 CALF    ZED    FAST    POOP      RIO    LEEK  
 BOMB    GNAW    DOCK    DOCK      TENSE    GAFF  
 THOUGH    CHOOSE    THOSE    THOSE    BOSS    NOM  
 GILT    KEEP    MET     THING    POO    DOUGH  
 PENT    BANK    CAUGHT    THING    ZEE    JILT  
 YAWL    ROT    POP     THING    THAD    TENT  
 ROOT    ROAD    RUDE    RUDE    POP    WALL  
 FEEL    TINT    MET     RUDE    LOW    LOOT  
 NAB    DECK    MAD    RUDE    GIN    VEAL  
 SHAW    VON    THONG    RUDE    MEND    DAB  
 JUICE    SOLE    CHOO    RUDE    CHAW    BON  
 PEEK    THIN    WEED    RUDE    JOE    GOOSE    THOLE  
 THIN    WEED    SHAG    RUDE    DID    TEAK    FIN  
 KEG    SHAG    NIP    RUDE    YEN    BAT    PEG  
 LONG    LOT    FOAL    RUDE    LAW    ROCK    WRONG  
 DUNE    FOAL    NIP    RUDE    ZOO    GOAT    TUNE  
 COAT    DUNE    PENCE    RUDE    DEED    BIT    MEET  
 HIT    BEET    DAN    RUDE    DAN    THEN    SHAD  
 CHAO    PENCE    THAW    RUDE    CHOP    JAWS    GOT  
 JOY    THAW    FORE    RUDE    FORE    NOON    DOLE  
 DILL    YIELD    FIT    RUDE    FIT    TEA    GILL  
 LENO    LAP    LEST    RUDE    LEST    RAMP    REND

PAGE 3

BOB      TOOT      PEST      FAN  
 MOAN    VILL      BANK    CARE  
 JEST    GAR     DOCK    BONG  
 THOUGHT    TOT    DOCK    BONG  
 THOSE    CHOOSE    CHOO    CHOO  
 THING    CHOOSE    CHOO    CHOO  
 MET    BANK    MAD    MAD  
 THAD    MET    MAD    MAD  
 POP    CAUGHT    CAUGHT    CAUGHT  
 WALL    POP    POP    POP  
 LOOT    RUDE    RUDE    RUDE  
 GIN    RUDE    RUDE    RUDE  
 MEND    MAD    MAD    MAD  
 CHAW    MAD    MAD    MAD  
 BON    CHAW    CHAW    CHAW  
 THOLE    CHOO    CHOO    CHOO  
 TEAK    CHOO    CHOO    CHOO  
 PEG    CHOO    CHOO    CHOO  
 ROCK    CHOO    CHOO    CHOO  
 GOAT    CHOO    CHOO    CHOO  
 TUNE    CHOO    CHOO    CHOO  
 BIT    CHOO    CHOO    CHOO  
 MEET    CHOO    CHOO    CHOO  
 SHAD    CHOO    CHOO    CHOO  
 GOT    CHOO    CHOO    CHOO  
 DOLE    CHOO    CHOO    CHOO  
 GILL    CHOO    CHOO    CHOO  
 REND    CHOO    CHOO    CHOO

PAGE 4

VAULT    BEE     BANK    CARE  
 DOTE    TICK    BONG    BONG  
 LEEK    GAFF    NOM    NOM  
 DUGH    JILT    WALL    WALL  
 TENT    TENT    LOOT    LOOT  
 VEAL    VEAL    GIN    GIN  
 DAB    DAB    MEND    MEND  
 BON    BON    CHAW    CHAW  
 THOLE    CHOO    CHOO    CHOO  
 FIN    CHOO    CHOO    CHOO  
 PEG    CHOO    CHOO    CHOO  
 WRONG    CHOO    CHOO    CHOO  
 TUNE    CHOO    CHOO    CHOO  
 MEET    CHOO    CHOO    CHOO  
 SHAD    CHOO    CHOO    CHOO  
 GOT    CHOO    CHOO    CHOO  
 DOLE    CHOO    CHOO    CHOO  
 GILL    CHOO    CHOO    CHOO  
 REND    CHOO    CHOO    CHOO

DIAGNOSTIC RHYME TEST

WORD LIST  
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PAGE 1

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PAGE 3

PAGE 4

BOB	COOT	PEST	PAN	GOR	TOOT	TEST	PAN
TAUNT	POND	VAULT	JOCK	DAUNT	BOND	FAULT	CHOCK
HOOT	BONE	DUES	NOTE	BOOT	MOAN	NEWS	DOZE
SHEET	BILL	BEE	THICK	CHEAT	VILI.	VEE	TICK
GAP	GUEST	BANK	CHAIR	JAR	JEST	THANK	CARE
TOT	THOUGHT	WAD	BONG	POT	FOUGHT	ROD	DONG
BOAST	POOP	SHOW	YOU	GHOST	COOP	SO	RUE
LIP	LEAP	RID	REEK	RIP	REAP	LID	LEEK
ZED	FAST	TENSE	GAFF	SAID	VAST	DENSE	CALP
GNAW	KNOCK	BOSS	BOHR	DAW	DOCK	HOSS	NOM
CHOOSE	DOZE	FOO	THOUGH	SHOES	THOSE	POOH	DOUGH
KEEP	THING	ZEE	JILT	CHEEP	SING	THEE	GILT
DANK	MET	FAD	TENT	BANK	NET	THAD	PENT
GOT	CAUGHT	POP	HALL	DOT	TAUGHTY	HOP	YAWL
LOAD	LEWD	ROW	ROOT	ROAD	RUDE	LOW	LOOT
DINT	PEEN	CHIN	VEAL	TINT	BEAN	GIN	FEEL
DECK	BAD	MEND	NAB	NECK	MAD	BEND	DAB
THONG	BOX	CHAW	VON	TONG	VOX	SHAW	BON
COO	BO	JUICE	SOLE	CHOO	JOE	GOOSE	THOLE
WEED	BID	TEAK	THIN	REED	DID	PEEK	FIN
SHAG	YEN	RAT	PEG	SAG	WREN	GAT	KEG
ROT	RAW	LOCK	LONG	LOT	LAW	ROCK	WRONG
VOLE	SUE	COAT	DUNE	FOAL	ZOO	BOAT	TUNE
NIP	DEED	BIT	MEET	DIP	NEED	HIT	BEET
FENCE	THAN	DEN	CHAO	PENCE	DAN	THEN	SHAD
THAN	CHOP	JAWS	GOT	SAW	COP	GAUZE	JOT
TOOL	THOR	MOON	BOWL	POOL	FORE	NOON	DOLE
WIELD	HIT	KEY	DILL	YIELD	FIT	TEA	BILL
LAP	REST	RAMP	LEND	RAP	LEBT	LAMP	REND

DIAGNOSTIC RHYME TEST

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PAGE 1

GOB DAUNT ROOT CHEAT GAR POT GHOST LIP SAID ONAW CHOOSE CHEEP DANK GOT LOAD DINT NECK THONG COO REED SHAG ROT VOLE DIP FENCE THAN THAW POOL HIELD RAP  
TOOT BOND BONE VILL GUEST FOUGHT COOP LEAP VAST KNOCK THOSE SING NET TAUGHT LEWD PEEN BAD VOX JOE BID YEN LAW COAT NEED THAN COP FORE FIT REST

PAGE 2

TEST FAULT NEWS VEE BANK ROD SO RUE RID DENSE BOSS FOO THEE PAD HOP ROW CHIN BEN VOX JUICE PEEK BAT LOCK DUNE HIT THEN JAWS NOON KEY LAMP

PAGE 3

BOB TAUNT NOTE TICK CHAIR DONG RUE REEK CALF BOMB DOUGH GILT PENT YANL ROOT VEAL NAB BON THOLE THIN PEG WRONG BEET CHAD JOY DOLE KEY GILL LEND

PAGE 4

COOT POND MOOT SHEET JAB TOT ROAST RIP ZED DAW SHOES KEEP RANK GOT ROAD TINT DECK TONG CHOO HEED BAG LOT POAL NIP FENCE SAW TOOL YIELD LAP

PEST VAULT OURS BEE JEST THOUGHT POOP REAP FAST DOCK OOZE THING MET CAUGHT RUDE BEAN MAD BOX DID WREN RAW ZOO DEED DAN CHOP HIT LEST

PAN JOCK DOTE THICK CARE BONG SHOW YOU LEER GAFF MOH THOUGH JILT TENT POP LOW LOOT SIN FEEL HEND DAB SHAW VON GOOSE BOLE TEAK PIN CAT KEG ROCK LONG GOAT TUWE BIT MEET DEN SHAD DOT GAUZE MOON BOWL TEA DILL REND

**DIAGNOSTIC RHYME TEST**

**WORD LIST  
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**PAGE 1**

BOB	COOT
DAUNT	POOD
HOOT	FAULT
SHEET	VILL
GAS	GUES!
TOT	FOUGHT
HOST	COOP
LIP	LEAP
ZED	VAST
DAW	KNOCK
CHOOSE	DOZE
KEEP	THING
BANK	MET
DOT	TAUGHT
ROAD	LEWD
DINT	PEEN
NECK	HAD
THONG	VOX
CHOO	GO
WEED	BID
SHAG	WREN
ROT	LAW
VOLE	ZOO
HIP	NEED
PENCE	THAN
SAW	COP
POOL	THOR
WIELD	FIT
LAP	REBT

**PAGE 2**

PEST	PAN
DUES	JOCK
BEE	TICK
SANK	CHAIR
WAD	DONG
SO	RUE
RID	REEK
TENSE	CALP
MOSS	BOMB
POO	THOUGH
ZEE	JILT
THAO	TENT
HOP	YAWN
LOW	ROOT
CHIN	VEAL
BEND	DAB
CHAN	BON
GOOSE	SOLE
TEAK	THIN
BAT	KEG
LOCK	WRONG
COAT	TUNE
BIT	BEET
DEN	CHAO
GAUZE	JOT
NOON	BOWL
KEY	CILL
RAMP	LEND

**PAGE 3**

BOB	TOOT
TAUNT	BOND
BOOT	BONE
CHEAT	BILL
JAB	JEST
POT	THOUGHT
BOAST	POOP
RIP	REAP
BAJD	FAST
GNAW	DOCK
SHOES	THOSE
CHEEP	SING
DANK	NET
GOT	CAUGHT
LOAD	RUDE
TINT	BEAK
DECK	QAD
TONG	SCA
FOR	ICE
REED	DIG
SEE	YEA
LIT	PAW
FOAL	ZUG
OIP	DEED
FENCE	DAN
THAW	CHOP
TOOL	FORE
YIELD	HIT
RAP	LEST

**PAGE 4**

TEST	FAN
VAULT	CHOCK
NEWS	NOTE
VEE	THICK
THANK	CARE
ROD	DONG
SHOW	YOU
LID	LEEK
DENSE	BAPP
BOSS	MCH
POOH	DOUGH
THEE	GILT
FAD	PENT
POP	MALL
ROW	LOCY
GIN	FEEL
MEND	NAD
SHAW	VON
JUICE	THOLE
PEEK	FIN
GAT	PRO
ROCK	LONG
GOAT	DUNZ
MIT	HEET
THEN	SHAD
JAWS	GOT
MOON	DOLE
TEA	DYLL
LAHP	REND

DIAGNOSTIC RHYME TEST

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PAGE 1

GOB TAUNT BOOT CHEAT GAB POT GOAST LIP ZED DAN SHOES CHEEP DANK GOT ROAD TINT DECK TONG CHOD WEED RHAG ROT VOLE HIP FENCE THAW TOOL WIELD RAP

COOT BOND MOAN VILL GUEST FOUGHT POOP REAP FLAT DOCK THOSE SING NET TAUGHT LEWD BEAN MAD BOX GO BID YEN LAW SUE DEED THAN COP THOR HIT REST

TEST VAULT NEWS VEE SANK ROD SHOW RID TENSE MOSS POOH THEE FAD POP LOW GIN MEND SHAH GOOSE TEAK BAT LOCK COAT BIT DEN JAWS MOON KEY LAMP

PAN CHOCK DOTE TICK CHAIR DONG YOU LEEK GAFF NOM DRAGH GILT PENT YAWN FEEL DAB VON SOLE THIN PEG WRONG DUNE MEET CHAO JOT DILL LENA

ROB DAUNT Hoot SHEET JAB TOT GHOST RIP SAID CHAW CHOOSE KEEP RANK DOT LOAD DIHT NECK THONG COO REED BAG LOT FOAL DIP PENCE SAM POOL YIELD LAP

TOOT POND BONE BILL JEST THOUGHT COOP LEAP VABT KNOCK DOZE THING MET CAUGHT RUDE PEEN BAO VOX JOE DID WREN RAW ZOO NEED DAN CHOP FORE FIT LESY

PEST FAULT DUES BEE THANK MAD SO LID DENSE BOBB FOO ZEE THAD HOP ROW LOOT CHIN BEND CHAW JUICE PEEK SAT GAT ROCK GOAT MIT THEN GAUZE GOT NOON TEA RAMP

FAN JOCK NOTE THICK CARE BONG RUE REEK CALF BOMB THOUGH JILT TENT WALL VEAL NAB BON THOLE PIN KEG LONG TUNE BEET SHAD GOT DOLE GILL RENO

DIAGNOSTIC RHYME TEST

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PAGE 1

BOB  
DAUNT  
MOOT  
CHEAT  
GAB  
TOT  
BOAST  
RIP  
SAID  
GNAW  
SHOES  
KEEP  
CANK  
GOT  
ROAD  
TINT  
DECK  
THONG  
CHOO  
REED  
SAG  
ROT  
VOLE  
DIP  
FENCE  
THAW  
POOL  
YIELD  
RAP

TOOT  
BOND  
BONE  
BILL  
GUEST  
FOUGHT  
POOP  
LEAP  
VAST  
DOCK  
DOZE  
THING  
MET  
TAUGHT  
LEWD  
PEEN  
BAD  
VOX  
GO  
DID  
WREN  
RAH  
ZOO  
NEED  
MIT  
THAN  
COP  
FORE  
FIT  
REST

TEST  
FAULTY  
DUES  
VEE  
BANK  
MAD  
SHOW  
LID  
DENSE  
BOSS  
POOH  
ZEE  
FAD  
POP  
LOW  
GIN  
MEND  
CHAW  
GOOSE  
PEEK  
GAT  
LOCK  
COAT  
HIT  
DEN  
JAWS  
NOON  
TEA  
LAMP

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CHOCK  
NOTE  
THICK  
CHAIR  
DONG  
YOU  
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CALF  
MOM  
THOUGH  
JILT  
TENT  
YAWL  
ROOT  
VEAL  
NAS  
BON  
SOLE  
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KEG  
LONG  
TUNE  
BEET  
CHAD  
JOT  
DOLE  
GILL  
LEND

BOB  
TAUNT  
BOOT  
SHEET  
JAB  
POT  
GHOST  
LIP  
ZED  
DAW  
CHOOSE  
CHEEP  
BANK  
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NECK  
TONG  
COO  
WEED  
SHAG  
LOT  
FOAL  
NIP  
PENCE  
SAW  
TOOL  
WIELD  
LAP

COOT  
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MOAN  
VILL  
JEST  
THOUGHT  
COOP  
REAP  
FAST  
KNOCK  
THOSE  
SING  
NET  
CAUGHT  
RUDE  
BEAN  
MAO  
BOX  
JOE  
BID  
YEN  
LAW  
SUE  
DEED  
DAN  
CHOP  
THOR  
HIT  
LEST

PEST  
VAULT  
NEWS  
BEE  
THANK  
ROD  
SO  
RIO  
TENSE  
MOSS  
FOO  
THRE  
THAO  
HOP  
ROW  
LOOT  
CHIN  
BEND  
SHAW  
JUICE  
TEAK  
BAT  
ROCK  
GOAT  
BIT  
THEN  
GAUZE  
MOON  
KEY  
RAMP

PAN  
JOCK  
DOE  
TICK  
CARE  
BONG  
RUE  
LEEK  
GAFF  
BOMB  
DOUGH  
GILT  
PENT  
WALL  
FEEL  
DAB  
VON  
THOLE  
THIN  
PEG  
WRONG  
DUNE  
MEET  
SHAD  
GOT  
BOWL  
DILL  
REND

DIAGNOSTIC RHYME TEST

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PAGE 1

BOB	TOOT
DAUNT	POND
GOOT	BONE
CHEAT	BILL
JAB	GUEST
POT	THOUGHT
BOAST	POOP
LIP	LEAP
SAID	FAST
DAW	KNOCK
SHOES	DOZE
KEEP	SING
DANK	MET
GOT	CAUGHT
ROAD	LEWD
DINT	BEAN
DECK	MAD
TONG	BOX
COO	JOE
REED	DID
SHAG	HREN
ROT	RAW
VOLE	ZOO
DIP	DEED
FENCE	THAN
THAW	CHOP
POOL	FORE
WIELD	HIT
RAP	REST

PAGE 2

PEST	PAN
FAULT	JOCK
NEWS	NOTE
VEE	THICK
THANK	CHAIR
ROD	SONG
BLOW	YOU
RIO	REEK
DENSE	GAFF
MOS8	BOMB
POOH	THOUGH
ZEE	DILT
PAN	TENT
POP	HALL
LOW	ROOT
CHIN	FEEL
MEND	DAB
SHAW	VON
JUICE	THOLE
PEEK	FIN
BAT	KEG
LOCK	LONG
COAT	TUNE
HIT	MEET
DEN	CHAD
JAWS	GOT
NOON	DOLE
KEY	DILL
LAMP	LEND

PAGE 3

BOB	COOT
TAUNT	BOND
MOOT	MOAN
SHEET	VILL
BAR	JEST
TOT	FOUGHT
GHOSH	COOP
RIP	REAP
ZED	VAST
ONAN	DOCK
CHOOSE	THOSE
CHEEP	THING
BANK	NET
DOT	TAUGHT
LOAD	RUDE
TINT	PEEN
NECK	BAD
THONG	VOX
CHOO	GO
WEED	BID
SAC	YEN
LOT	LAW
FOAL	SUE
NIP	NEED
PENCE	DAN
BAW	COP
TOOL	THOR
YIELD	FIT
LAP	LEST

PAGE 4

TEST	PAN
VAULT	CHOCK
DUSS	DOZE
SEE	TICK
SANK	CARE
WAD	DONG
SO	RUE
LID	LEEK
TENSE	CALP
BOBS	MOM
FOO	DOUGH
THEE	JILT
TMAD	PENT
HOP	YAWN
ROW	LOOT
GIN	VEAL
BEND	NAB
CHAW	BON
GOOSIE	SOLE
TEAK	THIN
GAT	PEG
ROCK	WRONG
BOAT	DUNE
BIT	BEET
THEN	SHAD
GAUZE	JOT
MOON	BOWL
TKA	GILL
RAMP	REND

**DIAGNOSTIC RHYME TEST**

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**PAGE 1**

BOB	COOT
DAUNT	POND
DOOT	NOAN
CHEAT	BILL
JAB	JEST
TOT	FOUGHT
BOAST	COOP
RIP	REAP
SAID	FAST
DAW	DOCK
SHOES	DOZE
CHEEP	SING
DANK	NET
DOT	TAUGHT
LOAD	RUDE
DINT	PEEN
DECK	MAD
THONG	VOX
COO	GO
REED	BID
SHAG	YEN
ROT	RAW
VOLE	ZOO
DIP	NEED
PENCE	THAN
THAW	COP
POOL	PORE
VIELD	FIT
LAP	REST

**PAGE 2**

PEST	PAN
FAULT	JOCK
NEWS	OOTE
VEE	THICK
JEST	THANK
WAD	CARE
DOGS	DONG
SHOW	RUE
LID	LEEK
DENSE	GAFF
MOSS	MOM
POOH	THOUGH
SING	THEE
FAD	GILT
HOP	PENT
RON	YAWN
LOOT	LOOT
CHIN	VEAL
MEND	DAB
CHAW	BON
JUICE	SOLE
PEEK	THIN
BAT	PEG
LOCK	LONG
COAT	TUNP
HIT	BEET
THEN	CMAD
JAWS	JOT
NOON	DOLE
TEA	GILL
RAHP	LEND

**PAGE 3**

BOB	TOOT
DAUND	SOND
DOOT	SONE
CHEAT	SHEET
JAB	SAB
TOT	POT
BOAST	GHOST
RIP	LIP
SAID	ZED
DAW	ONAW
SHOES	CHOOSE
CHEEP	KEEP
DANK	BANK
DOT	GOT
LOAD	ROAD
DINT	TINT
DECK	NECK
THONG	TONG
COO	CHOO
REED	WEED
SHAG	SAG
ROT	LOT
VOLE	POAL
DIP	NIP
PENCE	FENCE
THAW	SAW
POOL	TOOL
VIELD	WIELD
LAP	RAP

**PAGE 4**

TEST	FAN
VAULT	CHOCK
DURE	NOTE
BEE	TICK
SANK	CHAIR
ROD	BONG
SO	YOU
RIO	REEK
TENSE	CALF
KNOCK	BOMB
BOSS	DOUGH
FOO	JILT
ZEE	JILT
THAD	TENT
POP	WALL
LOW	ROOT
LEND	GIN
BEAN	FEEL
BAD	NAB
BOX	YON
JOE	GOOSE
DID	TEAK
WREN	KEG
BAT	KEG
LAH	WRONG
SUE	DUNE
DEED	MEET
DAN	SHAD
DEN	GOT
GAUZE	BOWL
CHOP	DILL
THOR	RENO
HIT	
KEY	
LEST	
LAMP	

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PAGE 1

BOB DAUNT HOOT SHEET BAB POT GHOST LIP ZED OAH CHOOSE KEEP BANK GOT LOAD TINT DECK THONG CHOO WEED SHAG ROT VOLE OZP PENCE THAW POOL YIELD LAP  
TOOT PONO MOAN VILL GUEST THOUGHT POOP REAP VAST KNOCK THOSE SING NET TAUGHT RUDE BEAN BAD VOX GO GOOSE DID TEAK WREN LAW SUE DEEO DAN CHOP THOR FIT REST  
FAULT DUES BEE SANK ROD SO YOU RID TENSE MOSS FOO ZEE THAD POP ROW GIN HEND CHAN NAB GOOSE BAT LOCK COAT HIT DAN JAMS NOON TEA RAMP  
TEST PAN JOCK OOTE TICK CHAIR BONG YOU LEER CALF BOMBS DOUGH GILT PENT YANL FEEL NAB SOLE KEG WRONG FIN NAB THEN SHAD GOT BOWL GILL LEND

PAGE 2

TAUNT BOOT CHEAT JAB TOT BOAST RIP SAID GNAW DOCK DOZE CHEEP DINT NECK TONG COO REED SAG LOT FOAL MEET SHAD GOT BOWL GILL LEND

PAGE 3

BOND BONE BILL JEST FOUGHT COOP LEAP FAST DOCK DOZE THING CAUGHT LEWD PEEN MAD BOK JOE BID YEN RAW ZOO NIP FENCE SAW TOOL WIELD RAP  
COOT VAULT VEE THANK MAD SHON LID DENSE BOSS POOH THEE FAO MOP LOW CHIN BEND SHAW JUICE PEEK BAT ROCK GOAT NEED THAN COP FORE HIT LEST

PAGE 4

PAN CHOCK NOTE THICK CARE DONS RUE REEK GAPP MOM THOUGH JILT TENT WALL ROOT VEAL DAB VON THOLE THIN PEEK BEET CHAD JOT DOLE DILL REND  
PEST VAULT VEE THANK MAD SHON LID DENSE BOSS POOH THEE FAO MOP LOW CHIN BEND SHAW JUICE PEEK BAT ROCK GOAT NEED THAN COP FORE HIT LEST

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PAGE 1

BOB COOT TEST PAN BOB TOOT PEST FAN  
 TAUNT FOND VAULT JOCK DAINT BOND FAULT CHOCK  
 BOOT BONE NEWS NOTE MOOT MOAN DUES DOTE  
 CHEAT VILL VEE TICK SHEET BILL BEE THICK  
 GAS JEST BANK CARE JAB QUEST THANK CHAIR  
 POT FOUGHT ROD DONG TOT THOUGHT WAD SONG  
 BOAST POOP SHON YOU GHOST COOP SO RUE  
 LIP REAP RID LEEK RIP LEAP LIO REEK  
 SAID FAST DENSE GAFF ZED VAST TENSE CALF  
 SHAW DOCK BOSS MON DAN KNOCK MOSS BOMB  
 SHOES THOSE POOH DOUGH CHOOSE DOZE POO THOUGH  
 KEEP THING ZEE JILLY CHEEP BING THEE GILT  
 BANK NET THAO PENT DANK MET FAO TENT  
 DOT TAUGHT POP YAHL DOT CAUGHT HOP WALL  
 ROAD RUDE LOW LOOT LOAD LEWD ROW ROOT  
 DINT PEEN CHIN VEAL TINT BEAN DIN FEEL  
 DECK MAD MEND DAB NECK BAD BEND NAB  
 THONG VOX CHAW BON TONG BOX SHAW VON  
 ENDO JOE GOOSE THOLE COO OO JUICE SOLE  
 WEED BID TEAK THIN REZO DID PEEK FIN  
 BAS YEN GAT PEG BHAG WREN BAT KEB  
 LOT LAW ROCK WRONG ROT RAW LOCK LONG  
 VOLE SUE COAT DUNE FOAL ZOO GOAT TUNE  
 OIP NEED HIT BEET NIP DEED BIT MEET  
 FENCE DAN DEN SHAD PENCE THAN CHAO  
 THAW COP JAWS JOT SAW CHOP GAUZE GOT  
 TOOL THOR MOON BOWL POOL FORE NOON DOLE  
 YIELD PIT TEA GILL FIELD HIT KEY DILL  
 RAP LEST LAMP REND LAP REST RAMP LEND

PAGE 2

TEST PAN BOB TOOT PEST FAN  
 VAULT JOCK DAINT BOND FAULT CHOCK  
 NEWS NOTE MOOT MOAN DUES DOTE  
 TICK CARE JAB QUEST THANK CHAIR  
 ROD DONG TOT THOUGHT WAD SONG  
 SHON YOU GHOST COOP SO RUE  
 RID LEEK RIP LEAP LIO REEK  
 GAFF ZED VAST TENSE CALF  
 BOSS MON DAN KNOCK MOSS BOMB  
 DOUGH CHOOSE DOZE POO THOUGH  
 ZEE JILLY CHEEP BING THEE GILT  
 THAO PENT DANK MET FAO TENT  
 POP YAHL DOT CAUGHT HOP WALL  
 LOW LOOT LOAD LEWD ROW ROOT  
 CHIN VEAL TINT BEAN DIN FEEL  
 MEND DAB NECK BAD BEND NAB  
 GOOSE THOLE COO OO JUICE SOLE  
 TEAK THIN REZO DID PEEK FIN  
 GAT PEG BHAG WREN BAT KEB  
 ROCK WRONG ROT RAW LOCK LONG  
 COAT DUNE FOAL ZOO GOAT TUNE  
 HIT BEET NIP DEED BIT MEET  
 DEN SHAD PENCE THAN CHAO  
 JAWS JOT SAW CHOP GAUZE GOT  
 MOON BOWL POOL FORE NOON DOLE  
 TEA GILL FIELD HIT KEY DILL  
 LAMP REND LAP REST RAMP LEND

PAGE 3

BOB TOOT PEST FAN  
 DAINT BOND FAULT CHOCK  
 MOOT MOAN DUES DOTE  
 SHEET BILL BEE THICK  
 JAB QUEST THANK CHAIR  
 TOT THOUGHT WAD SONG  
 GHOST COOP SO RUE  
 RIP LEAP LIO REEK  
 ZED VAST TENSE CALF  
 DAN KNOCK MOSS BOMB  
 DOZE POO THOUGH  
 BING THEE GILT  
 DANK MET FAO TENT  
 DOT CAUGHT HOP WALL  
 LOAD LEWD ROW ROOT  
 TINT BEAN DIN FEEL  
 NECK BAD BEND NAB  
 TONG BOX SHAW VON  
 COO OO JUICE SOLE  
 REZO DID PEEK FIN  
 BHAG WREN BAT KEB  
 ROT RAW LOCK LONG  
 FOAL ZOO GOAT TUNE  
 NIP DEED BIT MEET  
 SHAD PENCE THAN CHAO  
 JOT SAW CHOP GAUZE GOT  
 BOWL POOL FORE NOON DOLE  
 GILL FIELD HIT KEY DILL  
 REND LAP REST RAMP LEND

PAGE 4

FAN  
 FAULT CHOCK  
 DUES DOTE  
 BEE THICK  
 THANK CHAIR  
 WAD SONG  
 SO RUE  
 LIO REEK  
 TENSE CALF  
 MOSS BOMB  
 POO THOUGH  
 THEE GILT  
 FAO TENT  
 HOP WALL  
 ROW ROOT  
 DIN FEEL  
 BEND NAB  
 SHAW VON  
 JUICE SOLE  
 PEEK FIN  
 BAT KEB  
 LOCK LONG  
 GOAT TUNE  
 BIT MEET  
 THEN CHAO  
 GAUZE GOT  
 NOON DOLE  
 KEY DILL  
 RAMP LEND

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BOB	COOT	PEST	PAN	BOR	TOOT	TEST	FAN
TAUNT	BOND	VAULT	CHOCK	DAUNT	POND	FAULT	JOCK
BOOT	BONE	NEWS	NOTE	HOOT	MOAN	DOES	DOZE
SHEET	BILL	BEE	THICK	CHEAT	VILL	VER	TICK
JAB	GUEST	THANK	CHAIR	GAB	JEST	SANK	CARE
TOT	FOUGHT	WAD	DONG	POT	THOUGHT	ROD	BOND
BOAST	COOP	SHOW	RUE	HOST	POOP	SO	YOU
RIP	REAP	LID	LEEK	LIP	LEAP	RIO	REEK
ZED	PAST	TENSE	GAPP	SAID	VAST	DENSE	CALF
GNAW	DOCK	BOSS	MOM	DAW	KNOCK	MOSS	BOMB
SHOES	THOSE	POOH	DOUGH	CHOOSE	DOZE	POO	THOUGH
CHEEP	BING	THEE	GILT	KEEP	THING	ZEE	JILT
BANK	NET	THAD	PENT	DANK	MET	PAO	TENT
DOT	CAUGHT	HOP	HALL	GOT	TAUGHT	POP	YAWN
LOAD	LEWD	ROW	ROOT	ROAD	RUDE	LOW	LOOT
DINT	PEEN	CHIN	VEAL	TINT	BEAN	GIN	FEEL
NECK	HAD	BEND	DAB	DECK	BAD	MEND	NAB
TONG	BOX	SHAW	VON	THONG	VOX	CHAN	BON
CHOO	JOE	GOOSE	THOLE	COO	GO	JUICE	SOLE
REED	DIO	PEEK	PIN	WEED	BID	TEAK	THIN
SHAG	VEN	BAT	PEG	SAB	WREN	GAT	KES
ROT	LAH	LOCK	WRONG	LOT	RAW	ROCK	LONG
VOLE	SUE	COAT	DUNE	FOAL	ZOO	GOAT	TUNE
DIP	NEED	HIT	BEET	NIP	DEED	BIT	MEET
PENCE	DAN	THEN	SHAD	FENCE	THAN	DEN	CHAD
SAN	CHOP	GAUZE	GOT	THAW	COP	JAWS	JOT
POOL	THOR	NOON	BOWL	TOOL	FORE	MOON	DOLE
WIELD	PIT	KEY	GILL	VIELD	HIT	TEA	DILL
LAP	REST	RAMP	LEND	RAP	LEST	LAMP	REND

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PAGE 1

BUD      TOOT      TEST      PAN      BOB      COOT      PEST      PAN  
 DAUNT    BOND      FAULT     CNOCK    TAUNT    POND      VAULT    JOCK  
 BOOT     MOAN      NEWS      OOTE     HOOT     BONE      DUES     NOTE  
 CHEAT    BILL      VEE      THICK    SHEET    VILL      BEE      TICK  
 GAB     GUEST     BANK      CHAIR    JAB     JEST      THANK    CARE  
 POT    FOUGHT    ROO      DONS     TOT     THOUGHT    MAD      BONG  
 GHOST    COOP      BO      RUE      BOAST    POOP      SHOW     YOU  
 RILL    NEAP      NIP      WREATH    HILL     REAP      RIP      HEATH  
 SAID    FAST      DENSE    GAPP     ZED     VAST      TENSE    CALF  
 SNAW    KNOCK     BOSS      BOMB     DAW     DOCK      MOSS     MOM  
 SHOES    DOZE     POOH      THOUGH    CHOOSE    THOSE      FOO      DOUGH  
 KEEP    THING     ZEE      JILT     CHEEP    SING      THEE     GILT  
 BANK    NET      THAO      PENT     DANK     MET      PAO      TENT  
 GOT    CAUGHT    POP      WALL     DOT     TAUGHT    HOP      YAWL  
 NOSE    NUDE      RODE     ROOSE    ROSE     RUDE      NODE     NOOSE  
 TINT    BEAN      GIN      FEEL     DINT    PEEN      CHIN     VEAL  
 DECK    MAD      MEND     DAB     NECK    BAO      BEND    NAB  
 THONG    BOX      CHAN     VON     TONG    VOX      SHAW    BON  
 COO    GO      JUICE    SOLE    CHEN    JOE      GOOSE    THOLE  
 WEED    DID      TEAK     FIN     REED    BID      PEEK    THIN  
 SAG    WREN      GAT     KEG     SHAG    YEN      BAT      PEG  
 KNOB    WROUGHT    ROT     GNAW    ROB     NOUGHT    NOT      RAW  
 VOLE    ZOO      COAT     TUNE    FOAL    SUR      GOAT    DUNE  
 DIP    NEED      HIT     BEET    NIP     DEED    BIT      MEET  
 PENCE    DAN      THEN    SHAD    FENCE    THAN    DEN      CHAO  
 SAW    COP      GAUZE    JOT     THAW    CHOP    JAWS    GOT  
 TOOL    THOR      MOON    BOWL    POOL    FORE    NOON    DOLE  
 YIELD    FIT      TEA     GILL    WIELD    HIT     KEY      DILL  
 SNAT    REST     RAP     NEO     RAT     NEST    NAP      RED

PAGE 2

TEST      PAN      BOB      COOT      PEST      PAN  
 FAULT     CNOCK    TAUNT    POND      VAULT    JOCK  
 NEWS      OOTE     HOOT     BONE      DUES     NOTE  
 THICK    SHEET    VILL      BEE      TICK  
 BANK      CHAIR    JAB     JEST      THANK    CARE  
 DONS     TOT     THOUGHT    MAD      BONG  
 RUE      BOAST    POOP      SHOW     YOU  
 WREATH    HILL     REAP      RIP      HEATH  
 DENSE    GAPP     ZED     VAST      TENSE    CALF  
 BOSS      BOMB     DAW     DOCK      MOSS     MOM  
 THOUGH    CHOOSE    THOSE      FOO      DOUGH  
 JILT     CHEEP    SING      THEE     GILT  
 PENT     DANK     MET      PAO      TENT  
 WALL    DOT     TAUGHT    HOP      YAWL  
 ROOSE    ROSE     RUDE      NODE     NOOSE  
 FEEL     DINT    PEEN      CHIN     VEAL  
 DAB     NECK    BAO      BEND    NAB  
 VON     TONG    VOX      SHAW    BON  
 SOLE    CHEN    JOE      GOOSE    THOLE  
 FIN     REED    BID      PEEK    THIN  
 TEAK    KEG     SHAG    YEN      BAT      PEG  
 ROT     GNAW    ROB     NOUGHT    NOT      RAW  
 COAT    TUNE    FOAL    SUR      GOAT    DUNE  
 HIT     BEET    NIP     DEED    BIT      MEET  
 BEET    THEN    SHAD    FENCE    THAN    DEN      CHAO  
 GAUZE    JOT     THAW    CHOP    JAWS    GOT  
 MOON    BOWL    POOL    FORE    NOON    DOLE  
 TEA     GILL    WIELD    HIT     KEY      DILL  
 NEO     RAT     NEST    NAP      RED

PAGE 3

BOB      COOT      PEST      PAN  
 TAUNT    POND      VAULT    JOCK  
 HOOT     BONE      DUES     NOTE  
 VILL    BEE      TICK  
 JAB     JEST      THANK    CARE  
 THOUGHT    MAD      BONG  
 POOP      SHOW     YOU  
 REAP      RIP      HEATH  
 ZED     VAST      TENSE    CALF  
 DAW     DOCK      MOSS     MOM  
 CHOOSE    THOSE      FOO      DOUGH  
 SING    THEE      GILT  
 DANK    MET      PAO      TENT  
 DOT     TAUGHT    HOP      YAWL  
 ROSE    RUDE      NODE     NOOSE  
 PEEN    CHIN      CHIN     VEAL  
 NECK    BAO      BEND    NAB  
 TONG    VOX      SHAW    BON  
 CHEN    JOE      GOOSE    THOLE  
 REED    BID      PEEK    THIN  
 KEG     SHAG    YEN      BAT      PEG  
 GNAW    ROB     NOUGHT    NOT      RAW  
 TUNE    FOAL    SUR      GOAT    DUNE  
 BEET    NIP     DEED    BIT      MEET  
 SHAD    FENCE    THAN    DEN      CHAO  
 THAW    CHOP    JAWS    GOT  
 BOWL    POOL    FORE    NOON    DOLE  
 GILL    WIELD    HIT     KEY      DILL  
 NEO     RAT     NEST    NAP      RED

PAGE 4

PEST      PAN  
 VAULT    JOCK  
 DUES     NOTE  
 BEE      TICK  
 THANK    CARE  
 MAD      BONG  
 SHOW    YOU  
 RIP      HEATH  
 TENSE    CALF  
 MOSS     MOM  
 FOO      DOUGH  
 THEE     GILT  
 PAO      TENT  
 HOP      YAWL  
 NODE     NOOSE  
 CHIN    VEAL  
 BEND    NAB  
 SHAW    BON  
 GOOSE    THOLE  
 PEEK    THIN  
 BAT      PEG  
 GOAT    DUNE  
 BIT      MEET  
 DEN      CHAO  
 JAWS    GOT  
 NOON    DOLE  
 KEY      DILL  
 NAP      RED

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BOB  
DAUNT  
DOOT  
CHEAT  
SAB  
BOT  
BOASTY  
HILL  
ZED  
SHAH  
SHORES  
KEEP  
BANK  
DOT  
ROSE  
TINT  
DECK  
TONG  
CHEW  
REED  
SHAB  
KNOD  
VOLE  
NIP  
PENCE  
SAM  
TOOL  
FIELD  
RAT

TOOT  
POND  
GONE  
VILL  
SUGST  
TWIGHT  
COOP  
HEAP  
FAST  
KNOCK  
DOZE  
THING  
MET  
CAUGHT  
NUDE  
PEEN  
HAD  
BOX  
MEND  
JOE  
DIO  
YEN  
HRUGHT  
BUR  
NEED  
DAN  
CHOP  
THOR  
HIT  
REST

TEST  
PAULY  
NEWS  
VEE  
BANK  
ROD  
SHOW  
RIP  
TENSE  
BOSS  
POON  
ZEE  
TMAD  
HOP  
NODE  
BIN  
HEND  
SHAH  
GOOSE  
PEEK  
BAT  
ROT  
COAT  
BIT  
DEN  
BAUZE  
MOON  
KEY  
NAP

FAN  
JOCK  
NOTE  
TICK  
CHASE  
SONY  
RUE  
WREATH  
GAFF  
BOMB  
THOUGH  
JILT  
TENT  
HALL  
ROOSE  
VEAL  
DAM  
THOMS  
THOLE  
PIN  
PEG  
SHAW  
DUNE  
BEET  
SHAD  
BOY  
BOWL  
KEY  
NEO

BOB  
TAUNT  
HOOT  
SHEET  
JAB  
TOT  
SHOOT  
RILL  
SAZO  
DAN  
CHOOSE  
CHEEP  
DANK  
BOT  
NOSE  
DINT  
NECK  
COO  
WEED  
BAG  
ROB  
FOAL  
DIP  
PENCE  
THAW  
POOL  
DILL  
SNAT

COOT  
BOND  
HOAN  
BILL  
JEST  
FOUGHT  
POOP  
REAP  
VAST  
DOCK  
THOSE  
BING  
NET  
TAUGHT  
RUDE  
BEAN  
BAD  
VOX  
BO  
BID  
WREN  
NOUGHT  
ZOO  
DEED  
THAN  
COP  
PORE  
FIT  
NEST

PEST  
VAULT  
DUES  
SEE  
JEST  
THANK  
WAD  
SO  
HIP  
DENSE  
MOSS  
FOO  
THEE  
PAD  
POP  
RODE  
CHIN  
BEND  
CHAN  
JUICE  
TEAK  
CAT  
NOT  
BOAT  
MIT  
THEN  
JAWS  
NOON  
TEA  
RAP

PAN  
CHOCK  
DOYE  
THICK  
CARE  
DONG  
YOU  
HEATH  
CALP  
MON  
DOUGH  
SILT  
PENT  
YAWN  
NOOSK  
FEEL  
NAB  
BON  
SOLE  
THIN  
HEG  
RAK  
TUNE  
MEET  
CHAO  
JOT  
DOLE  
BILL  
RED

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**PAGE 1**

BOB	COOT
TAUNT	BOND
HOOT	MOAN
CHEAT	VILL
JAB	GUEST
POT	FOUGHT
BOAST	COOP
RILL	NEAP
SAYD	PAST
DAW	DOCK
CHOOSE	DOZE
KEEP	SINS
BANK	NET
GOT	CAUGHT
ROSE	NUDE
TINT	BEAN
DECK	BAD
THONG	BOX
CHEW	JOE
REED	BID
SHAB	YEN
ROB	NOUGHT
VOLE	ZOO
NIP	NEED
PENCE	DAN
SAW	CHOP
TOOL	PORE
WIELD	FIT
RAT	REST

**PAGE 2**

TEST	PAN
VAULT	CHOCK
DUES	DOYE
VEE	TICK
THANK	CHAIR
ROD	DONG
SHOW	RUE
NIP	WREATH
DENSE	GAFF
MOSH	MOM
POJ	THOUGH
ZEE	GILT
THAD	PENT
POP	WALL
NODE	ROOSE
GIN	FEEL
HEND	HAB
CHAN	VON
GOOSE	THOLE
PEEK	THIN
BAT	PEG
NOT	RAW
COAT	TUNE
BIT	BEET
THEN	SHAD
GAUZE	DOT
MOON	DOLE
KEY	GILL
NAP	NED

**PAGE 3**

BOB	TOOT
DAUNT	POND
ROOT	BONE
SHEET	GILL
BAB	JEST
TOT	THOUGHT
CHHOST	POOP
NILL	REAP
ZEO	VAST
ONAH	KNOCK
SHOES	THOSE
CHEEP	THING
DANK	MET
DOT	TAUGHT
NOSE	RUDE
DINT	PEEN
NECK	MAD
TONG	VOX
COO	OO
WEED	DID
BAB	WREN
KNOB	WRUGHT
POAL	SUR
DIP	DEED
FENCE	THAN
THAW	COP
POOL	THOR
YIELD	HIT
GNAT	NEST

**PAGE 4**

PEST	FAN
FAULT	JOCK
NEWS	NOTE
BEE	THICK
BANK	CARE
WAD	SONG
SO	YOU
RIP	HEATH
TENSE	CALF
BOSS	BOMB
POOH	DOUGH
THEE	JILT
FAD	TENT
HOP	YANL
RODE	NOOSE
CHIN	VEAL
BEND	DAB
SHAN	BON
JUICE	SOLE
TEAK	FIN
GAT	KEG
ROT	SNAN
BOAT	DUNE
HIT	MEET
DEN	CHAO
JAH	JOY
NOON	BOWL
TEA	DILL
RAP	RED

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PAGE 1

BOB COOT TEST POND FAULT NEWS VILL JEST THANK CARE FIGHT FOUGHT POOP SO RIP FAST TENSE KNOCK DOZE SING MET CAUGHT NUDE PEEN HAD BOX JUICE TEAK WREN WROUGHT ZOO NEED DAN COP THOR HIT REST

PAGE 2

PAN JOCK NOTE TICK CARE DONG YOU WREATH GAFF BOMB THOUGH SILENT TENT WALL VEAL HEND SHAW VON SOLE THIN KER SNOW ROT TUNE BEET SHAD JOT NOON KEY RAP

PAGE 3

BOB TAUNT MOOT SWEET GAB TOY BOAST RILL SAID SNAW SHOES CHEEP DANK DOT ROSE TINT NECK THONG PHEK REED SHAG ROB FOAL DIP FENCE THAW CHOP TOOL YIELD RAT

PAGE 4

PEST VAULT DUES BEE BANK MAD SHON RUE NIP DENSE POOH THEE FAD MOP NODE SIN BEND CMAX GOOSE PEEK YEN BAT PEG NOT BOAT MIT DEN JAWS MOON TEA RED PAN CHOCK DOTE THICK CHAIR SONG RUE NEATH CALP MOM DOUGH JILT PENT YANL NOOSE FEEL NAB BON THOLE PIN RAW DUNE MEET CHAD BOT DOLE GILL RED

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PAGE 1

BOB	TOOT
DAUNT	BOND
BOOT	BONE
SHEET	BILL
JAB	GUEST
TOT	FOUGHT
COAST	POOP
RILL	REAP
ZED	PAST
DAW	DOCK
SHOES	THOSE
CHEEP	THING
DANK	NET
GOT	CAUGHT
ROSE	NUDE
TINT	BEAN
NECK	HAD
THONG	BOX
COO	JOE
WEED	BID
SHAG	VEN
KNOB	NOUGHT
FOAL	ZOO
DIP	DEED
PENCE	DAN
THAW	CHOP
POOL	PORE
YIELD	FIT
RAT	REST

PAGE 2

TEST	FAN
FAULT	CHOCK
NEWS	NOTE
BEE	THICK
THANK	CHAIR
WAD	DONG
SHOW	YOU
NIP	NEATH
TENSE	GAFF
MOSS	MOM
POOH	DOUGH
THEE	JILT
FAD	PENT
POP	WALL
NODE	ROOSE
GIN	FEEL
BEND	DAB
CHAW	VON
JUICE	THOLE
TEAK	THIN
BAT	PEO
ROT	RAW
GOAT	TUNE
HIT	MEET
THEN	SHAO
JAWS	GOT
NOON	DOLE
TEA	BILL
NAP	NED

PAGE 3

BOB	COOT
TAUNT	POND
MOOT	MAN
CHEAT	VILL
BAR	JEST
POT	THOUGHT
HOST	COOP
MALL	NEAP
SATO	VAST
BNAW	KNOCK
CHOOSE	DOZE
KEEP	BING
BANK	MET
DOT	TAUGHT
NOSE	RUDE
DINT	PEEN
DECK	BAD
TONG	VOX
CHEW	SO
REED	DIO
SAB	WREN
ROB	WRUGHT
VOLE	SUE
NIP	NEED
FENCE	THAW
SAW	COP
TOOL	THOR
WIELD	HIT
GNAT	NEST

PAGE 4

PEST	PAN
VAULT	JOCK
DUES	DOZE
VEE	TICK
SANK	CARE
ROD	BONG
SO	RUE
RIP	WREATH
DENSE	CALF
BOSS	BOMB
FOO	THOUGH
IER	GILT
THAD	TENT
HOP	YAWL
RODE	NOOSE
CHIN	VEAL
MENO	NAB
BNAW	BON
SOLE	SOLE
PEEK	PIN
SAT	KEG
NOT	GNAW
COAT	DUNE
BIT	BEET
OEN	CHAO
BAUZI	JOT
MOON	BOWL
KEY	DILL
RAP	RED

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BOB	COOT	TEST	PAN	BOB	TOOT	PEST	FAN
TAUNT	BOND	VAULT	CHOCK	DAUNT	POND	FAULT	JOCK
BOOT	BONE	NEWB	NOTE	HOOT	MOAN	DUES	DOZE
CHEAT	VILL	VEE	TICK	SHEET	BILL	SEE	THICK
GAB	GUEST	SANK	CHAIR	JAR	JEST	THANK	CARE
POT	FOUGHT	ROD	DONG	TOT	THOUGHT	NAD	SONG
BOAST	COOP	SHOW	RUE	GHOSH	POOP	SO	YOU
WILL	READ	RIP	NEATH	RILL	NEAP	NIP	WREATH
ZEO	VAST	TENSE	CALF	SAID	FAST	DENSE	GAFF
GNAW	KNOCK	BOBB	ROMB	OAH	DOCK	MOSS	HOM
CHOOSE	DOZE	FOO	THOUGH	SHOES	THOSE	POOH	DOUGH
CHEEP	SING	THEE	GILT	KEEP	THING	ZEE	JILT
BANK	NET	THAD	PENT	DANK	MET	FAD	TENT
DOT	TAUGHT	HOP	YAWL	GOT	CAUGHT	POP	WALL
ROSE	NUDE	NODE	ROOBE	NOSE	RUDE	RODE	NOOSE
TINT	BEAN	GIN	FEEL	DINT	PEEN	CHIN	VEAL
NECK	BAD	BEND	NAB	DECK	MAD	HEND	DAB
THONG	VOX	CHAN	BON	TONG	BOX	SHAW	VON
CHEN	JOE	GOOSE	THOLE	COO	OO	JUICE	SOLE
WEED	BIO	TEAK	THIN	REED	DID	PEEK	FIN
SHAG	YEN	BAT	PEG	BAG	WREN	GAT	KEG
ROB	NOUGHT	HOT	RAW	KNOB	WRUGHT	ROT	GNAW
VOLE	ZOO	COAT	TUNE	FOAL	BUE	GOAT	DUNE
NIP	NEED	BIT	BEET	DIP	DEED	HIT	MEET
FENCE	THAN	DEN	CHAN	PENCE	DAN	THEN	SHAO
THAW	COP	JAWS	JOT	SAW	CHOP	GAUZE	GOT
POOL	FORE	NOON	DOLE	TOOL	THOR	MOON	BOWL
WIELD	HIT	KEY	DILL	YIELD	PIT	TEA	BILL
GNAT	NEST	RAP	RED	RAT	REST	NAP	NED

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BOB COOT TEST PAN BOB TOOT PEST PAN  
 TAUNT POND VAULT JOCK DAUNT BOND FAULT CHOCK  
 BOOT HOAN NEWS DOTE MOOT BONE DUES NOTE  
 CHEAT BILL VEE THICK SNEET VILL SEE TICK  
 GAB JEST SANK CARE JAB GUEST THANK CHAIR  
 TOT THOUGHT WAD BONG POT FOUGHT ROO DONG  
 BOAST POOP SHOW YOU GHOST COOP SO RUE  
 NIL REAP RIP HEATH RILL NEAP NIP WREATH  
 ZED FAST TENSE GAFF SAID VAST DENSE CALF  
 DAW DOCK MOSS HOM SHAW KNOCK BOSS BOMB  
 CHOOSE DOZE FOO THOUGH SHOES THOSE POON DOUGH  
 CHEEP THING THEER JILT KEEP SING ZEE GILT  
 BANK NET THAD PENT DANK MET FAD TENT  
 DOT TAUGHT HOP YAH! BOT CAUGHT LUG WALL  
 ROSE NUDE NODE ROOSIE N' E RUDE NOOSE  
 TINT BEAN BIN FEEL C; PEEN C'IN VRAL  
 DECK BAU MEND NAB NECK MAD BEND DAB  
 THONG VOX CHAW BON TONG BOX SHAW YON  
 COO GO JUICE SOLE CHEW JOE GOOSE THOLE  
 REED BID PEEK THIN WEED DID TEAK PIN  
 SHAG WREN BAT KEG SAG YEN CAT PEG  
 ROB NOUGHT NOT RAW KNOB WROUGHT ROT SHAW  
 FOAL SUE GOAT DUNE VOLE ZOO COAT TUNE  
 NIP NEED BIT BEET DIP DEED MIT MEET  
 FENCE THAN DEN CHAO PENCE DAN THEN SHAD  
 SAW CHOP GAUZE BOT THAW COP JAWS JOT  
 POOL FORE NOON JOLE TOOL THOR MOON BOWL  
 YIELD FIT TEA BILL WIELD HIT KEY DILL  
 GNAT NEST RAP RED RYT REST HAP NEO

PAGE 2

TEST PAN BOB TOOT PEST PAN  
 VAULT JOCK DAUNT BOND FAULT CHOCK  
 NEWS DOTE MOOT BONE DUES NOTE  
 DOTE MOOT BONE DUES NOTE  
 THICK SNEET VILL SEE TICK  
 CARE JAB GUEST THANK CHAIR  
 WAD BONG POT FOUGHT ROO DONG  
 SHOW YOU GHOST COOP SO RUE  
 RIP HEATH RILL NEAP NIP WREATH  
 GAFF SAID VAST DENSE CALF  
 HOM SHAW KNOCK BOSS BOMB  
 THOUGH SHOES THOSE POON DOUGH  
 THEER JILT KEEP SING ZEE GILT  
 THAD PENT DANK MET FAD TENT  
 HOP YAH! BOT CAUGHT LUG WALL  
 NODE ROOSIE N' E RUDE NOOSE  
 BIN FEEL C; PEEN C'IN VRAL  
 MEND NAB NECK MAD BEND DAB  
 CHAW BON TONG BOX SHAW YON  
 JUICE SOLE CHEW JOE GOOSE THOLE  
 PEEK THIN WEED DID TEAK PIN  
 BAT KEG SAG YEN CAT PEG  
 NOT RAW KNOB WROUGHT ROT SHAW  
 GOAT DUNE VOLE ZOO COAT TUNE  
 BIT BEET DIP DEED MIT MEET  
 DEN CHAO PENCE DAN THEN SHAD  
 CHOP GAUZE BOT THAW COP JAWS JOT  
 FORE NOON JOLE TOOL THOR MOON BOWL  
 FIT TEA BILL WIELD HIT KEY DILL  
 NEST RAP RED RYT REST HAP NEO

PAGE 3

BOB TOOT PEST PAN  
 DAUNT BOND FAULT CHOCK  
 BONE DUES NOTE  
 VILL SEE TICK  
 GUEST THANK CHAIR  
 POT FOUGHT ROO DONG  
 COOP SO RUE  
 NEAP NIP WREATH  
 VAST DENSE CALF  
 SHAW KNOCK BOSS BOMB  
 THOSE POON DOUGH  
 SING ZEE GILT  
 MET FAD TENT  
 CAUGHT LUG WALL  
 RUDE NOOSE  
 PEEN C'IN VRAL  
 MAD BEND DAB  
 BOX SHAW YON  
 GOOSE THOLE  
 DID TEAK PIN  
 YEN CAT PEG  
 WROUGHT ROT SHAW  
 COAT TUNE  
 DEED MIT MEET  
 DAN THEN SHAD  
 COP JAWS JOT  
 THOR MOON BOWL  
 HIT KEY DILL  
 REST HAP NEO

PAGE 4

PEST PAN  
 FAULT CHOCK  
 DUES NOTE  
 SEE TICK  
 THANK CHAIR  
 ROO DONG  
 SO RUE  
 NIP WREATH  
 DENSE CALF  
 BOSS BOMB  
 POON DOUGH  
 ZEE GILT  
 FAD TENT  
 LUG WALL  
 RODE NOOSE  
 C'IN VRAL  
 BEND DAB  
 SHAW YON  
 GOOSE THOLE  
 TEAK PIN  
 CAT PEG  
 ROT SHAW  
 COAT TUNE  
 MIT MEET  
 DAN THEN SHAD  
 COP JAWS JOT  
 THOR MOON BOWL  
 HIT KEY DILL  
 REST HAP NEO

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BOB	COOT	PEST	PAN	GOR	TOOT	TEST	FAN
TAUNT	POND	VAULT	JOCK	DAUNT	BOND	FAULT	CHOCK
HOOT	BONE	DUES	NOTE	ROOT	MOAN	NEWS	DOSE
CHEAT	VILL	VEE	TICK	SHEET	BILL	BEE	THICK
GAB	JEST	SANK	CARE	JAB	GUEST	THANK	CHAIR
POT	POUGHT	ROD	DONG	TOT	THOUGHT	WAD	SONG
HOST	COOP	SO	RUE	BOAST	POOP	SHOW	YOU
RILL	REAP	NIP	NEATH	NILL	NEAP	RIP	WREATH
SAID	FAST	DENSE	GAFF	ZED	VAST	TENSE	CALF
CHAN	KNOCK	BOSS	BOMB	NAW	DOCK	MOSH	MOM
SHOES	THOSE	POOH	DOUGH	CHOOSE	DOZE	FOO	THOUGH
CHEEP	THING	THEE	JILT	KEEP	SING	ZEE	GILT
DANK	NET	FAD	PENT	BANK	MET	THAD	TENT
DOT	CAUGHT	HOP	HALL	BOT	TAUGHT	POP	YAWL
ROSE	RUDE	NODE	NOOSE	NOBE	NUDE	RODE	ROOSE
TINT	BEAN	GIN	FEEL	DINT	PEEN	CHIN	VEAL
DECK	BAD	MEND	NAR	NECK	MAD	BEND	DAB
THONB	VOX	CHAN	BON	TONG	BOX	SHAW	VON
COD	JOE	JUICE	THOLE	CHEW	GO	GOOSE	SOLE
WEED	BIO	TEAK	THIN	REED	DID	PEEK	FIN
BAG	YEN	GAT	PEG	SHAG	WREN	BAT	KEG
ROB	WROUGHT	HOT	GNAW	KNOB	NOUGHT	ROT	RAW
VOLE	ZOO	COAT	TUNE	FOAL	SUE	GOAT	DUNE
DIP	NEED	HIT	BEET	NIP	DEED	BIT	MEET
PENCE	THAN	THEN	CHAD	PENCE	DAN	DEN	SHAD
THAW	CHOP	JAWS	GOT	SAW	COP	GAUZE	JOT
TOOL	THOR	MOON	BOWI	POOL	FORE	NOON	DOLE
WIELD	HIT	KEY	DILL	YIELD	FIT	TEA	GILL
RAT	REST	NAP	NED	GNAT	NEST	RAP	RED

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PAGE 1	PAGE 2	PAGE 3	PAGE 4
GOB	COOT	TEST	PAN
TAUNT	BOND	VAULT	CHOCK
HOOT	BONE	DUFS	NOTE
SHEET	VILL	BEEF	TICK
RAB	JEST	BANK	CARE
POT	FOUGHT	ROD	DONG
BOAST	POOP	SHOW	YOU
RILL	REAP	NIP	NEATH
SAID	FAST	DENSE	GAFF
DAW	KNOCK	MOSS	BOMB
SHOES	DOZE	POOH	THOUGH
KEEP	SING	ZEE	GLLT
DANK	NET	FAD	PFNT
DOT	TAUGHT	HOP	YAWL
ROSE	RUOE	NODE	NOOSE
DINT	PEEN	CHIN	VEAL
NECK	BAD	BEND	NAB
TONG	VOX	SHAH	RON
CHEW	JOE	GOOSE	THOLE
REED	BID	PEEK	THIN
SAG	YEN	GAT	PEG
KNOB	NOUGHT	POT	RAW
FOAL	SUE	GOAT	DUNE
DIP	NEEO	HIT	BEET
PENCE	DAN	THEN	SHAD
THAW	CHOP	JAWS	GOT
POOL	FORE	NOON	DOLE
YIELD	FIT	TEA	GILL
GNAT	REST	RAP	NED
			RAT
			TOOT
			DAUNT
			ROOT
			CHEAT
			JAR
			TOT
			HOST
			COOP
			NILL
			ZED
			GNAW
			CHOOSE
			CHEEP
			RANK
			GOT
			NUDE
			BFAN
			MAD
			THONG
			COO
			WEED
			SHAG
			ROB
			VOLE
			NIP
			FENCE
			SAW
			TOOL
			WIELD
			RAT
			TOOT
			DAUNT
			NEAR
			VAST
			DOCK
			THOSE
			NET
			CAUGHT
			NUDE
			BOX
			GO
			OID
			WREN
			WROUGHT
			ZOO
			DEED
			THAN
			COP
			THOR
			HIT
			NEST
			PEST
			FAULT
			NEWS
			VEE
			THANK
			WAU
			SO
			RIP
			TENBE
			BOSS
			FOO
			THEE
			THAD
			POP
			RODE
			GIN
			MEND
			CHAW
			JUICE
			SOLE
			TEAK
			BAT
			KED
			GNAW
			TUNE
			BIT
			MEET
			DEN
			GAUZE
			JOT
			BOWL
			DILL
			RED

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BOB      TOOT      PEST      FAN      GOR      COOT      TEST      PAN  
 TAUNT    BOND      VAULT     CHOCK    DAINT    POND      FAULT    JOCK  
 MOOT     BONE      DUES      NOTE     ROOT     MOAN      NEWS     DOTE  
 CHEAT    VILL      VEE       TICK     SHEET    BILL      BEE      THICK  
 JAB      GUEST     THANK     CHAIR    GAR     JEST      BANK     CARE  
 POT      FOUGHT    ROD       DONG     TOT      THOUGHT    MAD     BONG  
 GHOST    POOP      BO        YOU     BOAST    COOP      SHOW     RUE  
 NILL     REAP      RIP       NEATH    RILL     NEAP      NIP     WREATH  
 SAID     FAST      DENSE     GAFF     ZED      VAST      TENSE    CALP  
 DAW      KNOCK     MOBS     BOMB     GNAW     DOCK      BOSS     MON  
 CHOOSE   DOZE     FOO       THOUGH    SHOES    THOSE     POOH     DOUGH  
 KEEP     SING      ZEE       GILT     CHEEP    THING     THEE     JILT  
 DANK     MET       FAD       TENT     BANK     NET      THAD     PENT  
 GOT      TAUGHT    FOP       YAWN    DOT      CAUGHT    HOP     WALL  
 NOSE    NUDE      ROOE     ROOSE    ROSE     RUDE     NODE     NOOSE  
 DINT    BEAN      CHIN     FEEL     TINT     PEEN     GIN     VEAL  
 DECK    BAD       MENO     NAB     NECK     MAD     REND    DAB  
 TONG    VOX       SWAN     BON     THONG    BOX     CHAW     VON  
 CHEW    JOE       GOOSE    THOLE    COD     GO     JUICE    SOLE  
 REED    DIO       PEEK     FIN     NEED    BID     TEAK     THIN  
 SAG     YEN       GAT     PEG     SHAG    WREN     BAT     KEG  
 ROB     NOUGHT    NOT     RAW     KNOB    WROUGHT    ROT     GNAW  
 FOAL    ZOO       GOAT     TUNE    VOLE     SUE     COAT    DIUNE  
 DIP     NEED     MIT     BEET    NIP     DEED     BIT     MEET  
 FENCE   DAN       DEN     SHAD    PENCE    THAN     THEN     CHAD  
 THAW    COP       JANS    JOT     BAW     CHOP    GAUZE    GOT  
 TOOL    THUR     MOON     BOWL    POOL    FORE     NOON    DOLE  
 WIELD   HIT       KEY     DILL    YIELD    FIT     TEA     GILL  
 GNAT    REST     RAP     NED     RAT     NEST    NAP     RED

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PEST      FAN      GOR      COOT      TEST      PAN  
 VAULT     CHOCK    DAINT    POND      FAULT    JOCK  
 DUES      NOTE     ROOT     MOAN      NEWS     DOTE  
 VEE       TICK     SHEET    BILL      BEE     THICK  
 THANK     CHAIR    GAR     JEST      BANK     CARE  
 ROD       DONG     TOT      THOUGHT    MAD     BONG  
 BO        YOU     BOAST    COOP      SHOW     RUE  
 RIP       NEATH    RILL     NEAP      NIP     WREATH  
 DENSE     GAFF     ZED      VAST      TENSE    CALP  
 BOMB     BOMB     GNAW     DOCK      BOSS     MON  
 FOO       THOUGH    SHOES    THOSE     POOH     DOUGH  
 ZEE       GILT     CHEEP    THING     THEE     JILT  
 FAD       TENT     BANK     NET      THAD     PENT  
 YAWN     YAWN     DOT      CAUGHT    HOP     WALL  
 ROOE     ROOSE    ROSE     RUDE     NODE     NOOSE  
 CHIN     CHIN     FEEL     TINT     PEEN     GIN     VEAL  
 MENO     MENO     NAB     NECK     MAD     REND    DAB  
 SWAN     SWAN     BON     THONG    BOX     CHAW     VON  
 GOOSE    GOOSE    THOLE    COD     GO     JUICE    SOLE  
 PEEK     PEEK     FIN     NEED    BID     TEAK     THIN  
 GAT     GAT     PEG     SHAG    WREN     BAT     KEG  
 NOT     NOT     RAW     KNOB    WROUGHT    ROT     GNAW  
 GOAT     GOAT     TUNE    VOLE     SUE     COAT    DIUNE  
 MIT     MIT     BEET    NIP     DEED     BIT     MEET  
 DEN     DEN     SHAD    PENCE    THAN     THEN     CHAD  
 JANS     JANS     JOT     BAW     CHOP    GAUZE    GOT  
 MOON     MOON     BOWL    POOL    FORE     NOON    DOLE  
 KEY     KEY     DILL    YIELD    FIT     TEA     GILL  
 RAP     RAP     NED     RAT     NEST    NAP     RED

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COOT      TEST      PAN  
 POND     FAULT    JOCK  
 MOAN     NEWS     DOTE  
 BILL     BEE     THICK  
 JEST     BANK     CARE  
 THOUGHT    MAD     BONG  
 COOP     SHOW     RUE  
 NEAP     NIP     WREATH  
 VAST     TENSE    CALP  
 DOCK     BOSS     MON  
 SHOES    POOH     DOUGH  
 CHEEP    THEE     JILT  
 BANK     THAD     PENT  
 NET     HOP     WALL  
 CAUGHT    NODE     NOOSE  
 ROSE     NODE     NOOSE  
 TINT     GIN     VEAL  
 NECK     REND    DAB  
 THONG    CHAW     VON  
 COD     GO     JUICE  
 NEED    BID     TEAK  
 SHAG     BAT     KEG  
 KNOB     ROT     GNAW  
 VOLE     COAT    DIUNE  
 NIP     DEED     BIT  
 PENCE    THAN     THEN  
 BAW     CHOP    GAUZE  
 POOL    FORE     NOON  
 YIELD    FIT     TEA  
 RAT     NEST    NAP

PAGE 4

TEST      PAN  
 FAULT    JOCK  
 NEWS     DOTE  
 BEE     THICK  
 BANK     CARE  
 MAD     BONG  
 SHOW     RUE  
 NIP     WREATH  
 TENSE    CALP  
 BOSS     MON  
 POOH     DOUGH  
 THEE     JILT  
 THAD     PENT  
 HOP     WALL  
 NODE     NOOSE  
 GIN     VEAL  
 REND    DAB  
 CHAW     VON  
 JUICE    SOLE  
 TEAK     THIN  
 BAT     KEG  
 ROT     GNAW  
 COAT    DIUNE  
 BIT     MEET  
 THEN     CHAD  
 CHOP    GAUZE  
 FORE     NOON  
 FIT     TEA  
 NEST    NAP

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BOB      COOT      PEST      PAN      GOB      TOOT      TEST      FAN  
 TAUNT    BOND      VAULT     CHOCK     DAINT     POND     FAULT     JOCK  
 MOOT     MOAN      DUES      DOTE      BOOT      BONE     NEWS      NOTE  
 CHEAT    BILL      VEE      THICK     SHEET     VILL     BEE      TICK  
 GAB     GUEST     BANK      CHAIR     JAB      JEST     THANK     CARE  
 TOT     THOUGHT    MAD      BONG      POT      FOUGHT     ROO      DONG  
 BOAST    POOP     SHOW      YOU      GHOST     COOP     SO      RUE  
 RILL     REAP     NIP      NEATH     HILL      NEAP     RIP      WREATH  
 SAID     VAST     DENSE     CALP      ZEO      FAST     TENSE     GAFF  
 OAH     KNOCK     MOBS     BOMB     GNAW      DOCK     BOSS     MOM  
 CHOOSE    THOSE    FOO      DAUGH     SHOES     DOZE     POOH     THOUGH  
 CHEEP    SING      THEE     GILT      KEEP      THING     ZEE      JILT  
 DANK     NET      PAO      PENT      BANK      MET      THAO     TENT  
 DOT     CAUGHT     HOP      WALL      GOT      TAUGHT     POP      YAWL  
 NOSE    NUDE      RODE     ROOSE     ROSE      RUDE     NODE     NOOSE  
 TINT    BEAN      GIN      FEEL      DINT      PEEN     CHIN     VEAL  
 DECK    MAD      MEND     DAB      NECK      BAD      BENO     NAB  
 TONG    VOX      SHAW     BON      THONG     BOX      CHAW     VON  
 CHEW    JOE      GOUSE     THOLE     COO      GO      JUICE     SOLE  
 REED    DID      PEEK     FIN      HEED     BID      TEAK     THIN  
 SAG     YEN      GAT      PEG      SHAG     WREN     BAT      NEG  
 KNOB    WROUGHT    ROT      GNAW     RDR      NOUGHT     NOT      RAW  
 VOLE    ZOO      COAT     TUNE      FOAL      SUE      GOAT     DUNE  
 NIP     DEED     BIT      MEET     DYP      NEED     MIT      BEET  
 PENCE    DAN      THEN     SHAD     FENCE     THAN     DEN      CHAO  
 SAM     CHOP     GAUZE    GOT      THAW     COP      JAWS     JOY  
 TOOL    THOR     HOP'N    BOWL     POOL      FORE     NOON     DOLE  
 WIELD    FIT      KPY      GILL     YIELD     HIT      TEA      DILL  
 GNAT    REST     GAP      NEO      RAT      NEST     NAP      RED

PAGE 2

PEST      PAN      GOB      TOOT      TEST      FAN  
 DAINT     POND     FAULT     JOCK  
 DUES      DOTE      BOOT      BONE     NEWS      NOTE  
 VEE      THICK     SHEET     VILL     BEE      TICK  
 BANK     CHAIR     JAB      JEST     THANK     CARE  
 MAD      BONG      POT      FOUGHT     ROO      DONG  
 SHOW     YOU      GHOST     COOP     SO      RUE  
 NIP      NEATH     HILL      NEAP     RIP      WREATH  
 DENSE     CALP      ZEO      FAST     TENSE     GAFF  
 BOMB     GNAW      DOCK     BOSS     MOM  
 DAUGH     SHOES     DOZE     POOH     THOUGH  
 THEE     GILT      KEEP      THING     ZEE      JILT  
 PAO      PENT      BANK      MET      THAO     TENT  
 HOP      WALL      GOT      TAUGHT     POP      YAWL  
 NUDE     RODE      ROOSE     ROSE     RUDE     NODE     NOOSE  
 GIN      FEEL      DINT      PEEN     CHIN     VEAL  
 MEND     DAB      NECK      BAD      BENO     NAB  
 SHAW     BON      THONG     BOX      CHAW     VON  
 GOUSE     THOLE     COO      GO      JUICE     SOLE  
 PEEK     FIN      HEED     BID      TEAK     THIN  
 GAT      PEG      SHAG     WREN     BAT      NEG  
 ROT      GNAW     RDR      NOUGHT     NOT      RAW  
 COAT     TUNE      FOAL      SUE      GOAT     DUNE  
 BIT      MEET     DYP      NEED     MIT      BEET  
 DAN      THEN     SHAD     FENCE     THAN     DEN      CHAO  
 CHOP     GAUZE    GOT      THAW     COP      JAWS     JOY  
 HOP'N    BOWL     POOL      FORE     NOON     DOLE  
 KPY      GILL     YIELD     HIT      TEA      DILL  
 GAP      NEO      RAT      NEST     NAP      RED

PAGE 3

GOB      TOOT      TEST      FAN  
 POND     FAULT     JOCK  
 BONE     NEWS      NOTE  
 VILL     BEE      TICK  
 JEST     THANK     CARE  
 POT      FOUGHT     ROO      DONG  
 COOP     SO      RUE  
 NEAP     RIP      WREATH  
 FAST     TENSE     GAFF  
 DOCK     BOSS     MOM  
 DOZE     POOH     THOUGH  
 THING     ZEE      JILT  
 MET      THAO     TENT  
 TAUGHT     POP      YAWL  
 RUDE     NODE     NOOSE  
 PEEN     CHIN     VEAL  
 BAD      BENO     NAB  
 BOX      CHAW     VON  
 GO      JUICE     SOLE  
 BID      TEAK     THIN  
 SHAG     WREN     BAT      NEG  
 NOUGHT     NOT      RAW  
 GOAT     MIT      BEET  
 NEED     DEN      CHAO  
 THAW     COP      JAWS     JOY  
 FORE     NOON     DOLE  
 HIT      TEA      DILL  
 RAT      NEST     RED

PAGE 4

FAULT     JOCK  
 NEWS      NOTE  
 BEE      TICK  
 THANK     CARE  
 ROO      DONG  
 SO      RUE  
 RIP      WREATH  
 TENSE     GAFF  
 BOSS     MOM  
 POOH     THOUGH  
 ZEE      JILT  
 THAO     TENT  
 POP      YAWL  
 NODE     NOOSE  
 CHIN     VEAL  
 BENO     NAB  
 CHAW     VON  
 JUICE     SOLE  
 TEAK     THIN  
 BAT      NEG  
 NOT      RAW  
 GOAT     DUNE  
 MIT      BEET  
 DEN      CHAO  
 JAWS     JOY  
 NOON     DOLE  
 TEA      DILL  
 NAP      RED

DIAGNOSTIC RHYME TEST

WORD LIST  
JACB

PAGE 1

GOB TAUNT MOOT CHEAT JAB TOT ROAST RILL SAID GNAW CHOOSE KEEP RANK DOT ROSE TINT NECK THONG CHEW REED SHAG ROB FOAL VIP PENCE SAW TOOL YIELD RAT

COOT POND HOAN BILL JEST THOUGHT POOP NEAP FAST DOCK DOZE SING MET TAUGHT NUDE PEEN BAD VOX GO DOD DID WREN WROUGHT SUE NEED DAN COP THOR FIT REST

PAGE 2

TEST VAULT DUES VEE JEEST THOUGHT WAD SHOW NIP DENSE BOSS FOO ZEE THAD HOP NODE GIN BEND CHAW GOOSE PEEK RAT NOT GOAT BIT THEN GAUZE MOON TEA NAP

PAGE 3

PAN JOCK THICK CARE BONG YOU GHOST WREATH GAFF MOM HOM THOUGH GILT TENT YAWL ROOSE VEAL NAB BON SOLE FTN KEG GNAW DIJNE BEET SHAD JOT BOWL GILL NED

ROB DALINT ROOT SHEET GAR POT NILL ZED DAN SHOES CHEEP NET GOT NOSE DINT DECK TONG COO WEED SAG KNOB VOLE DIP FENCE THAW POOL WIELD GNAT

TOOT BOND BONE VILL GUEST FOUGHT COOP REAP VAST KNOCK THOSE THING NET CAUGHT RUDE BEAN MAD BOY JOE BID YEN NOUGHT ZOO DEED THAN CHOP FORE HIT NEST

PEST FAULT NEWS BEEF SANK ROD SO RIP TENSE MOSS POOH THEE PAD FOP RODE CHIN MEND SHAW JUICE TEAK GAT ROT COAT MIT DEN JAWS NOON KEY RAP

PAGE 4

FAN CHOCK NOTE TICK CHAIR DONG RUE NEATH CALF BOMB DOUGH JILT PENT WALL NOOSE FEEL DAB VON THOLE PEG RAW TUNE MEET CHAD GOT DOLE DILL RED

DIAGNOSTIC RHYME TEST

WORD LIST  
397A

PAGE 1	PAGE 2	PAGE 3	PAGE 4
BOB	COOT	PEST	PAN
TAUNT	POUND	VAULT	JOCK
BOOT	MOAN	NEWS	DOE
SHEET	VILL	REE	TICK
JAB	JEST	THANK	CARE
POT	THOUGHT	ROD	BONG
ROAST	COOP	SHOW	RUE
NILL	REAP	RIP	NEATH
SAID	VAST	DENSE	CALF
GNAN	DOCK	BOSS	MOM
SHOES	DOZE	POOH	THOUGH
KEEP	THING	ZEE	JILT
DANK	MET	FAD	TENT
GOT	CAUGHT	FOP	WALL
NOSE	NUDE	RODE	ROOSE
TINT	PEEN	GIN	VFAL
DECK	BAD	MEND	NAB
TONG	BOX	SHAW	VON
COO	GO	JUICE	SOLE
WEED	DID	TEAK	FIN
SHAG	YEN	BAT	PPG
KNOB	NOUGHT	ROT	RAH
FOLL	ZOO	GOAT	TUNE
DIP	DEED	HIT	MEET
PENCE	THAN	THEN	CHAD
THAW	COP	JAWS	JOY
POOL	THOR	NOON	BOWL
WIELD	HIT	KEY	DILL
RAT	NEST	NAP	RED
			GWAT
			REST
			RAP
			NED
			GILL
			DOLE
			BOT
			SHAD
			BIT
			BEET
			DENE
			GNAW
			KEG
			FEEL
			CHIN
			NODE
			NOOSE
			DAB
			BON
			THOLE
			THIN
			PEEK
			GAT
			NOT
			COAT
			BIT
			DEN
			REST
			TEA
			RAP

DIAGNOSTIC RHYME TEST

WORD LIST  
387B

PAGE 1

BOB	TOOT
DAUNT	POUND
BOOT	BONE
CHEAT	VILL
GAB	JEST
POT	FOUGHT
BOAST	POOP
RILL	REAP
SAID	VAST
DAW	DOCK
CHOOSE	THOSE
KEEP	THING
DANK	NET
DOT	TAUGHT
NOSE	RUDE
DINT	PEEN
DECK	MAD
THONG	BOX
CHEW	GO
WEED	DID
SAG	YEN
ROB	WROUGHT
VOLF	SUE
DIP	NEED
PENCE	THAN
SAW	COP
POOL	FORE
WIELD	FIT
RAT	NEST

PAGE 2

PEST	FAN
FAULT	JOCK
BONE	NEWS
VILL	VEE
JEST	SANK
FOUGHT	ROD
POOP	SHOW
REAP	NIP
VAST	DENSE
DOCK	MOSS
THOSE	FOO
THING	ZEE
NET	FAO
TAUGHT	HOP
RUDE	RODE
PEEN	CHIN
MAD	MENO
BOX	CHAN
GO	GOOSE
DID	TEAK
YEN	GAT
WROUGHT	NOT
SUE	COAT
NEED	HIT
THAN	THEN
COP	GAUZE
FORE	NOGN
FIT	KEY
NEST	NAP

PAGE 3

COB	COOT
TAUNT	BOND
HOOT	HOAN
SHEET	BILL
JAB	GUEST
TOT	THOUGHT
GHOSH	COOP
NILL	NEAP
ZED	FAST
GNAW	KNOCK
DOUGH	SHOES
JILT	CHEEP
PENT	RANK
YAWN	GOT
MOSE	ROSE
CHIN	TINT
MENO	NECK
CHAN	TONG
GOOSE	COO
TEAK	REFD
GAT	PEFG
NOT	GNAW
COAT	DUNE
HIT	BEET
THEN	CHAN
GAUZE	JOT
NOGN	DOLE
KEY	GILL
NAP	RED

PAGE 4

TEST	PAN
VAULT	CHOCK
QUES	DOYE
BEE	THICK
THANK	CHAIR
WAH	BONG
SO	RUE
RIP	WREATH
TENSE	CAFF
BOSS	BOMB
POOH	THOUGH
THEE	GILT
THAD	TENT
POP	WALL
NONE	ROOSE
GIN	FEEL
BEND	NAB
SHAW	BON
JUICE	THOLE
PFEK	THIN
BAT	KEG
ROT	RAW
GOAT	TUNE
BIT	MEET
DEN	SHAD
JAWS	GOT
MOON	BOWL
HIT	OILL
TEA	NED
RAP	

## DIAGNOSTIC RHYME TEST

### WORD LIST SRAA

PAGE 1

BOB	COOT
DAUNT	POND
ROOT	BONE
SHEET	BILL
GAR	JEST
POT	FOUGHT
ROAST	POOP
WILL	NEAP
SAID	VAST
DAW	DOCK
SHOES	DOZP
CHEEP	THING
DANK	NET
DOT	TAUGHT
NOSE	NUDF
TINT	PFEN
DECK	MAD
THONG	VOX
CHEW	GA
REED	BID
SAG	YEN
ROB	NAUGHT
VOLF	SUE
NIP	NEED
FENCE	DAN
SAW	COP
POOL	FORE
YIELD	HIT
GNAT	REST

PAGE 2

PEST	PAN
FAULT	JACK
NEWS	NOTE
BEE	THICK
SANK	CARE
ROD	DONG
SNOW	YOU
NIP	WREATH
DENSE	CALF
MOSS	MOM
POOH	THOUGHT
THING	THEE
NET	JILT
FAD	PFNT
HOP	YAWL
RODE	ROOSE
GIN	VFAL
MEND	DAB
CHAW	BON
GOOSF	SOLE
PEEK	THIN
GAT	PFG
NOT	RAW
COAT	DUINE
BIT	RFET
DEN	SHAN
GAUZE	JAT
NOON	DALE
TEA	DILL
RAP	NFD

PAGE 3

GOR	TOOT
TAUNT	BOND
MOOT	MOAN
CHEAT	VILL
JAR	GUEST
TOT	THOUGHT
GHOST	COOP
NTL	REAP
ZED	FAST
GNAW	KNOCK
CHOOSE	THOSE
KEFP	SING
RANK	MET
GOT	CAUGHT
ROSE	RUDE
PINT	BFAN
NECK	BAD
TONG	BOX
FOO	JOE
WEFO	DID
SHAG	WREN
KNOB	WROUGHT
FOAL	ZOO
RIP	DEED
PENCE	THAN
THAW	CHOP
TOOL	THOR
WIFLO	FIT
RAT	NEST

PAGE 4

TEST	FAN
VAULT	CHOCK
DUES	DOYE
VEE	TICK
THANK	CHAIR
WAD	BONG
SO	RUE
RIP	NEATH
TENSE	GAFF
BOSS	BOMB
FOO	DCUGH
ZEE	GILT
THAD	TENT
FOP	WALL
NODE	NOOSE
CHIN	FEEL
BEND	NAB
SHAW	VON
JUICE	THOLE
TEAK	FIN
BAT	KEG
ROT	GNAW
GOAT	TUNE
HIT	MEET
THEN	CHAD
JAWS	GOT
MOON	BOWL
KEY	GILL
NAP	RED

## DIAGNOSTIC RHYME TEST

### WORD LIST 3688

PAGE 1	PAGE 2	PAGE 3	PAGE 4
BOB	COOT	PEST	PAN
TAUNT	BOND	VAULT	CHOCK
ROOT	HOAN	NEWS	DATE
CHEAT	VILL	VEE	TICK
GAB	JEST	SANK	CARE
TOT	FOUGHT	WAD	DONG
GHOST	COOP	SO	RUE
NILL	NEAP	RIP	WREATH
ZED	FAST	TENSE	GAFF
GNAW	KNOCK	BOSS	BOB
CHOOSE	THOSE	FOR	DRUGH
CHEEP	THING	THEE	JILY
BANK	NET	THAO	PENT
DOT	CAUGHT	HOP	WALL
NOSE	RUOE	RODE	NROSE
TINT	BEAN	GIN	FEEL
DECK	BAD	MENO	NAB
TONG	VDX	SHAW	BON
COO	JOE	JUICE	THOLE
REED	BID	PEEK	THIN
SHAG	WREN	BAT	KEG
ROB	WRUGHT	NOT	GNAW
VOLE	ZOO	COAT	TUNE
NIP	DEED	BIT	MEET
PENCE	THAN	THFN	CHAD
THAN	CHOP	JAWS	GOT
POOL	FORE	NOON	DOLE
WIELD	HIT	KEY	DTLL
GNAT	NEST	RAP	RFD
BOB	TOOT	TEST	FAN
DAUNT	POND	FAULT	JOCK
MOOT	BONE	OUES	NOTE
SHEET	BILL	BEE	THICK
JAB	QUEST	THANK	CHAIR
POT	THOUGHT	ROO	BONG
ROAST	POOP	SHOW	YOU
RILL	REAP	NIP	NEATH
SAIO	VAST	DENSE	CALF
RAW	DOCK	HOSS	MOM
DOZE	POOH	POOH	THOUGH
KEEP	SING	ZEE	GILT
DANK	MET	PAO	TENT
GOT	TAUGHT	POP	YAWN
ROSE	NIIQE	NODE	ROOSE
DINT	PEEN	CHIN	VEAL
NECK	MAD	BEND	DAB
THONG	BOX	CHAN	VON
CHEW	GO	GOOSE	SOLE
WEED	DID	TEAK	FIN
SAG	VEN	BAT	PEG
KNOB	NOUGHT	ROT	RAW
FOAL	SIE	GOAT	DUNE
DIP	NEED	HIT	BEET
FENCE	OAN	DEN	SHAD
SAW	COP	GAUZE	JOT
TOOL	THOR	MOON	BOWL
YIELD	FIT	TEA	GILL
RAT	REST	NAP	NED

## DIAGNOSTIC RHYME TEST

### WORD LIST 308A

PAGE 1	PAGE 2	PAGE 3	PAGE 4
BOB	COOT	PEST	PAN
TAUNT	BONO	VAULT	CHOCK
MOOT	BONE	DUES	NOTE
SHEET	VILL	BEE	TICK
GAB	JEST	BANK	CARE
POT	FOUGHT	ROD	DONG
HOST	POOP	SO	YOU
RILL	REAP	NIP	NEATH
SAID	VAST	DENSE	CALF
GNAW	KNOCK	BOSS	BOMB
SHOES	THOSE	POOH	DOUGH
CHEEP	THING	THEE	JILT
BANK	MET	THAD	TENT
GOT	CAUGHT	FOP	WALL
NOSE	RUDE	RODE	NOOSE
DINT	PEEN	CHIN	VEAL
NECK	BAD	BEND	NAB
THONG	VOX	CHAW	BON
CHEW	JOE	GOOSE	THOLE
WEED	BID	TEAK	THIN
SAC	WREN	GAT	KEG
ROB	WRROUGHT	NOT	GNAW
FOAL	ZOO	GOAT	TUNE
DIP	NEED	HIT	BEET
FENCE	THAN	DEN	CHAD
SAW	CHOP	GAUZE	GOT
TOOL	THOR	MOON	BOWL
WIELD	FIT	KEY	GILL
GNAT	NEST	RAP	RED
			RAT
			REST
			NAP

DIAGNOSTIC RHYME TEST

WORD LIST  
3498

PAGE 1	PAGE 2	PAGE 3	PAGE 4
GOB	TOOT	TEST	FAN
TAUNT	COND	VAULT	CHOCK
ROOT	BONE	NEWS	NOTE
CHEAT	VILL	VEE	TICK
JAB	JEST	THANK	CARR
POT	THOUGHT	POD	BONG
BOAST	POOP	SHOW	YOU
RILL	NEAP	NIP	WREATH
ZED	PAST	TENSE	GAFF
GNAW	DOCK	BOSS	MOM
SHOES	DOZE	POOH	THOUGH
CHEEP	SING	THEE	GILT
BANK	NET	THAD	PENT
GOT	TAUGHT	FOP	YAWN
NOSE	NUDE	RODE	ROOSE
TINT	PEEN	GIN	VEAL
NECK	BAD	BEND	NAB
THONG	VOX	CHAW	BON
COO	GO	JUICE	SOLE
WEED	BID	TEAK	THIN
SHAG	WREN	BAT	KEG
ROB	NOUGHT	NOT	RAW
VOLE	ZOO	COAT	TUNE
DIP	DEED	HIT	MEET
PENCE	DAN	THEN	SHAN
SAW	CHOP	GAUZE	GOT
TOOL	FORE	MOON	DOLF
YIELD	HIT	TEA	DILL
GNAT	NEST	RAP	RED
			RAT
			REST
			NAP
			NED
			GILL
			BIT
			THAW
			FIT
			THOR
			KEY
			NOON
			ROT
			GOAT
			BIT
			DEN
			JOT
			BEET
			CHAO
			GAT
			PEG
			GNAW
			DUNE
			WALL
			FEEL
			OAB
			VON
			THOLE
			FIN
			PEEK
			GEE
			GOAT
			ROT
			BIT
			THAW
			COP
			THOR
			KEY
			NOON
			REST
			NAP
			NED

DIAGNOSTIC RHYME TEST

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PAGE 1

BOB DAUNT HOOT CHEAT JAB POT BOAST NILL ZED DAW CHOOSE KEEP BANK GOT ROSE DINT NECK THONG CHEW WEED SAG ROB FOAL NIP FENCE THAW POOL YIELD RAT

TOOT POND HOAN BILL GUEST THOUGHT COOP NEAP FAST KNOCK THOSE THING MET CAUGHT RUDE PEEN MAD BOX JOE BID YEN NOUGHT ZOO DEED THAN CHOP THOR FIT NEST

PAGE 2

PEST FAULT DUES VEE THANK ROD SHOW RIP TENSE MOSS FOO ZEE THAD POP NODE CHIN REND CHAW GOOSE TEAK GAT NOT BOAT TUNE BIT DEN JAWS NOON FIT NAP

PAGE 3

GOB TAUNT DOTE CHAIR BONG RUE WREATH GAFF BAMA DRUGH JILT FENT WALL THOLE THIN PEG RAW TUNE HEET CHAN GOT BOWL TEA RED

COOT BOND BONE SHEET VILL GAB JEST FROUGHT GHOST RILL SAID VAST GNAW DOCK SHOES DOZE CHEEP SING DANK NET TAUGHT DOT BEAN DECK BAD TONG VOX COO GO REED SHAG KNOB VOLE SUE DIP FENCE SAW TOOL WIELD GNAT

PAGE 4

TEST VAULT NEWS BEE BANK WAD SO NIP DENSE BOSS POON THEE FAD HOP RODE GIN MEND SHAW JUICE PEEK BAT ROT COAT MIT THEN GAUZE MOON KEY RAP

PAN CHOCK NOTE TICK CARE DONG YOU NEATH CALF MOM THOUGH GILT PENT YAHL ROOSE PEEL NAB BON SOLE PIN KEG GNAW DUNE BFET SWAD JOY DOLE DILL NED

DIAGNOSTIC RHYME TEST

WORD LIST  
3108

PAGE 1

ROB COOT  
DAUNT BOND  
HOOT BONE  
CHEAT BILL  
JAB JEST  
TOT THOUGHT  
BOAST POOP  
BILL REAP  
ZED FAST  
GNAW DOCK  
CHOOSE THOSE  
KEEP THING  
DANK MET  
DOT CAUGHT  
NOSE NUDE  
DINT PEEN  
DECK BAD  
THONG VOX  
CHEW JOE  
REED BID  
SHAG YEN  
KNOB WROUGHT  
VOLE SUE  
DIP NEED  
PENCE THAN  
THAW COP  
TOOL THOR  
FIELD HIT  
RAT REST

PAGE 2

PEST PAN  
FAULT CHOCK  
DOES NOTE  
VEE THICK  
THANK CARE  
WAD BONG  
SHOW YOU  
NIP NEATH  
FAST TENSE  
DOCK BOSS  
THOSE FOO  
THING ZEF  
MET FAD  
CAUGHT HOP  
NUDE RODE  
PEEN CHIN  
BAD HEND  
VOX CHAW  
.JOE GORSE  
REED PEEK  
SHAG BAT  
KNOB ROT  
VOLE COAT  
DIP MIT  
PENCE THEN  
THAW JAH  
TOOL MOON  
FIELD HIT  
RAT NAP

PAGE 3

GOB TAUNT  
ROOT SHEET  
GAR GUEST  
POT FOUGHT  
GHOST COOP  
HILL NEAP  
GAFF SAID  
MOM VAST  
DOUGH SHOES  
ZEF JILT  
FAD TENT  
HOP WALL  
RODE ROSE  
CHIN VEAL  
HEND HAB  
VOX BON  
.JOE THOLE  
REED PEEK  
SHAG PEG  
KNOB ROT  
VOLE COAT  
DIP MIT  
PENCE THEN  
THAW JOT  
TOOL MOON  
FIELD HIT  
RAT NED

TOOT  
POND  
MOAN  
VILL  
GUEST  
FOUGHT  
COOP  
NEAP  
VAST  
KNOCK  
DOZE  
SING  
NET  
TAUGHT  
RUDE  
BEAN  
HAB  
TONG  
BOX  
GO  
WEED  
SAG  
ROB  
DUNE  
BEET  
CHAD  
FENCE  
SAW  
POOL  
YIELD  
GNAT

TEST  
VAULT  
NEWS  
BEE  
SANK  
ROD  
SO  
RIP  
DENSE  
MOSS  
POOH  
THEE  
TMAD  
POP  
NODE  
NOSE  
GIN  
BEND  
SHAW  
VON  
JUICE  
TEAK  
GAT  
DOUGHT  
ZOO  
DEED  
DAN  
CHOP  
FORE  
FIT  
NEST

PAGE 4

FAN  
JOCK  
DOTE  
TICK  
CHAIR  
DONG  
RUE  
WREATH  
CALF  
BOMB  
THOUGH  
GILT  
PENT  
YAWL  
FEEL  
DAB  
VON  
SOLE  
FIN  
KEG  
RAW  
TUNE  
MEET  
SHAD  
GOT  
DOLE  
GILL  
RED

DIAGNOSTIC RHYME TEST

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PAGE 1

BOB COOT PEST PAN GOR TOOT TEST FAN  
 DAUNT BOND FAULT CHOCK TAUNT POND VAULT JOCK  
 BOOT MOAN NEWS DOTE MOOT BONE DUES NOTE  
 CHEAT BILL VEE THICK SHEET VILL BEE TICK  
 GAS JEST BANK CARE JAB GUEST THANK CHAIR  
 TOT THOUGHT WAD BONG POT FOUGHT ROO DONG  
 BOAST COOP SHOW RUE GHOST POOP SO YOU  
 RILL NEAP NIP WREATH NILL REAP RIP NEATH  
 SAID FAST DENSE GAFF ZED VAST TENSE CALF  
 GNAW DOCK BOSS MOM DAW KNOCK MOSS BOMB  
 SHOES THOSE POOH DOUGH CHOOSE OOZE FOO THOUGH  
 CHEEP THING THEE JILT KEEP SING ZEE GILT  
 DANK MET FAD TENT BANK NET THAD FENT  
 GOT CAUGHT FO WALL DOT TAUGHT HOP YAWN  
 NOSE NUDE "D" ROOSE ROSE RUDE NODE NOOSE  
 TINT BEAN BIN FEEL DINT PEEN CHIN VEAL  
 DECK MAD MEND DAB NECK BAD BEND NAB  
 THONG VOX CHAW BON TONG BOX SHAW VON  
 CHEW JOE GOOSE THOLE COO GO JUICE SOLE  
 REED BID PEEK THIN WEED DID TEAK FIN  
 SHAG YEN BAT PEG SAG WREN GAT KEG  
 ROB WROUGHT NOT GNAW KNOB NOUGHT ROT RAW  
 VOLE ZOO COAT TUNE FOAL SUE GOAT DUNE  
 NIP NEED BIT BEET DIP DEED HIT MEET  
 PENCE DAN THEN SHAD FENCE THAN DEN CHAO  
 THAN COP JAWS JOT SAW CHOP GAUZE GOT  
 TOOL THOR MOON BOWL POOL FORE NOON DOLE  
 WIELD HIT KEY DILL YIELD FIT TEA GILL  
 RAT NEST NAP RED GNAT REST RAP NED

PAGE 2

PAN CHOCK TAUNT POND TOOT TEST FAN  
 FAULT DOTE MOOT BONE DUES NOTE  
 NEWS VEE THICK SHEET VILL BEE TICK  
 DOTE BONG POT FOUGHT ROO DONG  
 CARE RUE GHOST POOP SO YOU  
 JAB NILL REAP RIP NEATH  
 GUEST THANK CHAIR CALF  
 POT CHOOSE OOZE FOO THOUGH  
 BONG RUE GHOST POOP SO YOU  
 SHEET DAW KNOCK MOSS BOMB  
 VILL NILL REAP RIP NEATH  
 GHOST DAW KNOCK MOSS BOMB  
 WREATH NILL REAP RIP NEATH  
 GAFF ZED VAST TENSE CALF  
 MOM DAW KNOCK MOSS BOMB  
 DAW CHOOSE OOZE FOO THOUGH  
 JILT KEEP SING ZEE GILT  
 TENT BANK NET THAD FENT  
 WALL DOT TAUGHT HOP YAWN  
 ROOSE ROSE RUDE NODE NOOSE  
 FEEL DINT PEEN CHIN VEAL  
 DAB NECK BAD BEND NAB  
 BON TONG BOX SHAW VON  
 CHAW THOLE COO GO JUICE SOLE  
 GOOSE THIN WEED DID TEAK FIN  
 PEEK BAT PEG SAG WREN GAT KEG  
 THIN BEET DIP DEED HIT MEET  
 NOT GNAW KNOB NOUGHT ROT RAW  
 COAT TUNE FOAL SUE GOAT DUNE  
 BIT BEET DIP DEED HIT MEET  
 DAN THEN SHAD FENCE THAN DEN CHAO  
 JAWS JOT SAW CHOP GAUZE GOT  
 THOR MOON BOWL POOL FORE NOON DOLE  
 HIT KEY DILL YIELD FIT TEA GILL  
 NEST NAP RED GNAT REST RAP NED

PAGE 3

GOR TAUNT POND TOOT TEST FAN  
 DOME BONE DUES NOTE  
 SHEET VILL BEE TICK  
 JAB GUEST THANK CHAIR  
 POT FOUGHT ROO DONG  
 GHOST POOP SO YOU  
 NILL REAP RIP NEATH  
 VAST KNOCK MOSS BOMB  
 DAZE SING ZEE GILT  
 KEEP NET THAD FENT  
 TENT BANK NET THAD FENT  
 WALL DOT TAUGHT HOP YAWN  
 ROSE RUDE NODE NOOSE  
 DINT PEEN CHIN VEAL  
 NECK BAD BEND NAB  
 TONG BOX SHAW VON  
 DAB DIP DEED HIT MEET  
 BON FOAL SUE GOAT DUNE  
 CHOW SAG WREN GAT KEG  
 SHAD FENCE THAN DEN CHAO  
 JOT SAW CHOP GAUZE GOT  
 BOWL POOL FORE NOON DOLE  
 DILL YIELD FIT TEA GILL  
 RED GNAT REST RAP NED

PAGE 4

TEST VAULT FAN  
 VAULT DUES NOTE  
 DUES BEE TICK  
 THANK ROO DONG  
 RIP SO YOU  
 TENSE FOO THOUGH  
 MOSS ZEE GILT  
 FOOD THAD FENT  
 PENT HOP YAWN  
 NODE CHIN VEAL  
 CHIN BEND NAB  
 BEND SHAW VON  
 NAB SHAW VON  
 SHAW JUICE SOLE  
 VON TEAK FIN  
 GAT GAT KEG  
 ROT ROT RAW  
 GOAT HIT MEET  
 HIT DEN CHAO  
 MEET GAUZE GOT  
 CHAO NOON DOLE  
 GOT TEA GILL  
 DOLE RAP NED

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PAGE 1

GOB	COOT
TAUNT	BOND
BOOT	BONE
CHEAT	BILL
JAB	GUEST
TOT	FOUGHT
BOAST	POOP
NILL	REAP
SAYD	FAST
GNAW	KNOCK
SHOES	THOSE
KEEP	SING
DANK	NET
GOT	TAUGHT
ROSE	NUDE
DINT	PEEN
DECK	BAD
THONG	VOX
CHEW	JOE
WEED	DID
SHAG	WREN
KNOB	NOUGHT
FOAL	SUE
DIP	NEED
PENCE	DAN
THAW	CHOP
POOL	FORE
YIELD	FIT
RAT	REST

PAGE 2

TEST	PAN
Vault	CHOCK
BONE	NEWS
VEE	THICK
WAD	CHAIR
SHOW	DONG
RIP	NFATH
DENSE	GAFF
BORS	BOMB
POOH	DOUGH
ZEE	GILT
FAD	PENT
FOP	YAWN
NUDE	ROOSE
CHYN	VEAL
MEND	NAB
CHAW	BON
GOOSE	THOLE
TEAK	FIN
BAT	KEG
ROT	RAW
GOAT	DUINE
HIT	BEET
THEN	SWAO
JAWS	GOT
NOON	DOLE
TEA	GILL
NAP	NED

PAGE 3

BOB	TOOT
MOOT	PONO
SHEET	MOAN
GAB	JEST
POT	THOUGHT
GHOST	COOP
RILL	NEAP
ZEN	VAST
DAW	DOCK
CHOOSE	DOZE
CHEEP	THING
RANK	MET
DOT	CAUGHT
NOSE	RUDE
TINT	BEAN
NECK	MAD
TONG	BOX
COO	GO
REED	BID
BAG	YEN
ROB	WRUGHT
VOLE	ZOO
NIP	DEED
FENCE	THAN
SAW	COP
TOOL	THOR
WIELD	HIT
GNAT	NEST

PAGE 4

PEST	PAN
FAULT	JOCK
DUES	DOTE
SEE	TICK
SANK	CARE
ROD	BONG
SO	RUE
NIP	WREATH
TENSE	CALF
MOSS	MOM
FOO	THOUGH
THEE	JILT
THAD	TENT
HOP	WALL
RODE	NOOSE
GIN	FEEL
BEND	DAB
SHAW	VON
JUICE	SOLE
PEEK	THIN
GAT	PEG
NOT	GNAW
COAT	TUNE
BIT	HEET
DEN	CHAD
GAUZE	JOT
MOON	BOWL
KEY	OILL
RAP	RED

DIAGNOSTIC RHYME TEST

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PAGE 1	PAGE 2	PAGE 3	PAGE 4				
ROB	TOOT	PEST	FAN	GOB	COOT	TEST	PAN
TAUNT	POND	VAULT	JOCK	DAUNT	BOND	FAULT	CHOCK
ROOT	BONE	NEWS	NOTE	HOOT	MOAN	DUES	DOE
SHEET	VILL	BEE	TICK	CHEAT	BILL	VEE	THICK
JAB	JEST	THANK	CARE	GAR	GUEST	SANK	CHAIR
POT	FOUGHT	ROD	DONG	TOT	THOUGHT	WAD	BONG
GHOST	POOP	SO	YOU	ROAST	COOP	SHOW	RUE
NTLL	REAP	RIP	NEATH	RILL	NEAP	HIP	WREATH
SAID	VAST	DENSE	CALF	ZEO	FAST	TENSE	GAFF
DAW	DOCK	MOSS	MOM	GNAW	KNOCK	BOSS	BOMB
CHOOSE	THOSE	FOO	DOUGH	SHOES	DOZE	POOH	THOUGH
CHEEP	SING	THEE	GILT	KEEP	THING	ZEE	JILT
BANK	NET	THAD	PENT	DANK	MET	FAO	TENT
GOT	CAUGHT	TOP	WALL	DOT	TAUGHT	HOP	YAWL
ROSE	NUDE	NODE	ROOSE	NOSE	RUDE	RODE	NOOSE
DINT	BEAN	CHIN	FEEL	TINT	PFEN	GIN	VEAL
NECK	BAD	BEND	NAB	DECK	MAD	MEND	DAB
THONG	VOX	CHAN	BON	TONG	BOX	SHAW	VON
COO	JOE	JUICF	THOLE	CHEW	GO	GOOSE	SOLF
REED	OIO	PEEK	FIN	WEED	BIO	TEAK	THIN
SHAG	WREN	RAT	KFG	SAG	YEN	GAT	PEG
ROB	NOUGHT	NOT	RAW	KNOR	WRUGHT	ROT	GNAW
FOAL	SUE	GOAT	DUNF	VOLE	ZOO	COAT	TUNE
DIP	DEED	HIT	MEET	NIP	NEED	BIT	BEET
FENCE	DAN	DEN	SHAO	PENCE	THAW	THEN	CHAD
SAW	CHOP	GAUZE	GOT	THAW	COP	JAWS	JOT
POOL	FORE	NOON	ULF	TOOL	THOR	MOON	BOWL
WIELD	FIT	KEY	GILL	YIELD	HIT	TEA	DILL
RAT	NEST	NAP	RED	GNAT	REST	RAP	NEO

DIAGNOSTIC RHYME TEST

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PAGE 1

GOB	COOT
TAUNT	BOND
BOOT	MOAN
SHEET	VILL
JAB	GUEST
POT	THOUGHT
ROAST	COOP
RILL	REAP
SAID	FAST
GNAW	KNOCK
SHOES	DOZE
CHEEP	SING
RANK	MET
GOT	CAUGHT
NOSE	RUDE
DINT	PEEN
NECK	MAD
THONG	ROX
COO	GO
WEED	OID
SAG	YEN
KNOR	VOUGHT
FOAL	ZOO
NIP	NEED
PENCE	THAN
SAW	COP
POOL	FORF
WIELD	FIT
GNAT	NEST

PAGE 2

TEST	PAN
VAULT	CHOCK
NEWS	DATE
BEF	TICK
THANK	CHAIR
ROD	BONG
SHOW	RUE
NIP	NEATH
DENSE	GAFF
ROSS	BOMA
POOH	THOUGH
THEE	GILT
THAD	TENT
FOP	HALL
RODE	NOOSE
CHIN	VFAT
REN	DAR
CHAW	VON
JUICE	SOLE
TEAK	FIN
GAT	PEG
POT	RAW
GOAT	THINF
BIT	HFET
THEN	CHAD
GAUZE	JOT
NOON	DALE
KEY	GILI
PAP	REFD

PAGE 3

DAINT	HOOT
HOOT	BONE
CHEAT	BTLL
RAR	JEST
TOT	FOUGHT
GHOST	POOP
NILL	NEAP
ZED	VAST
RAW	DOCK
CHOOSE	THOSE
KEEP	THING
DANK	NET
DOT	TAUGHT
ROSE	NUOE
TINT	BFAN
DECK	HAD
TONG	VOX
PHFW	JOF
REFD	RID
SHAG	WREN
ROH	WRUGHT
VOLE	SIF
DIP	DEED
FENCE	DAN
THAW	CHOP
TOOL	THOR
YIELD	HST
RAY	REST

PAGE 4

PEST	FAN
FAULT	JOCK
DUES	NOTE
VEE	THICK
SANK	CARE
WAD	DOONG
SO	YOU
RIP	WREATH
TENSE	CALF
MOSS	MOM
FOO	DOUGH
ZEE	JILT
FAD	PENT
HOP	YAKL
NORE	ROOSE
GIN	FEEL
MEND	NAB
SHAW	BON
GOOSE	THOLE
PEEK	THIN
BAT	KEG
NOT	GNAW
COAT	DUNE
HIT	MEET
DEN	SHAD
JAWS	GOT
MOON	BOWL
TEA	DILL
NAP	NEO

DIAGNOSTIC RHYME TEST

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PAGE 1

GOB COOT TEST PAN BOR TOOT PEST FAN  
 DAUNT POND FAULT JOCK TAUNT BOND VAULT CHOCK  
 HOOT BONE DUES NOTE ROOT MOAN NEWS DOTE  
 CHEAT BILL VEE THICK SHFET VJLL BEE TICK  
 JAB JEST THANK CARE CAR GUEST SANK CHAIR  
 TOT THOUGHT WAD BONG POT FOUGHT ROD DONG  
 GHOST COOP SO RUE ROAST POOP SHOW YOU  
 NILL REAP RIP NFATH SAID FAST DENSE WREATH  
 ZED VAST TENSF CALF DAW DOCK MOBS GAFF  
 GNAW KNOCK BOSS BOMB THOES THOSE POOH DOUGH  
 CHOOSE DOZE FOO THOUGH SHOES CHEEP THING THEE JILT  
 KEEP SING ZEE GILT RANK NET THAD PENT  
 DANK MET FAD TENT GOT TAUGHT FOP YANL  
 DOT CAUGHT HOP WALL ROSE RUDE NODE NOOSE  
 NOSE NUDE RODE ROOSE DINT PFEN CHIN VEAL  
 TINT SFAN GIN FEEL DECK MA'D MEND DAB  
 NECK BAD BEND NAB THONG BX CHAW VON  
 TONG VOX SHAW BN COO JOE JUICE THCLE  
 CHEW GO GOOSE SOLE WEED BID TEAK THIN  
 REED DID PEKF FIN SAG VEN GAT PEG  
 SHAG WREN BAT KEG KNOB WROUGHT ROT GNAW  
 ROR HOUGHT NOT RAW FOAL SUE GOAT DUNE  
 VOLE ZOO COAT TIINF NIP DEED BIT MEET  
 DIP NEED HIT BEET CHAD PENCE DAN THEN SHAD  
 FENCE THAN BEN JOT THAW CHOP JAWS GOT  
 SAW COP GALIZE NOON BOWL TOOL FORE MOON DOLE  
 POOL THOR FIT KEY GILL YIELD HIT TEA DILL  
 WIELD RAT NEST NAP RED GNAT REST RAP NEO

PAGE 2

TEST PAN BOR TOOT PEST FAN  
 FAULT JOCK TAUNT BOND VAULT CHOCK  
 DUES NOTE ROOT MOAN NEWS DOTE  
 VEE THICK SHFET VJLL BEE TICK  
 THANK CARE CAR GUEST SANK CHAIR  
 WAD BONG POT FOUGHT ROD DONG  
 COOP SO RUE ROAST POOP SHOW YOU  
 RIP NFATH SAID FAST DENSE WREATH  
 TENSF CALF DAW DOCK MOBS GAFF  
 BOSS BOMB THOES THOSE POOH DOUGH  
 FOO THOUGH SHOES CHEEP THING THEE JILT  
 ZEE GILT RANK NET THAD PENT  
 HOP WALL GOT TAUGHT FOP YANL  
 RODE ROOSE ROSE RUDE NODE NOOSE  
 GIN FEEL DINT PFEN CHIN VEAL  
 BEND NAB DECK MA'D MEND DAB  
 SHAW BN THONG BX CHAW VON  
 GOOSE SOLE COO JOE JUICE THCLE  
 PEKF FIN WEED BID TEAK THIN  
 BAT KEG SAG VEN GAT PEG  
 NOT RAW KNOB WROUGHT ROT GNAW  
 COAT TIINF FOAL SUE GOAT DUNE  
 HIT BEET NIP DEED BIT MEET  
 BEN CHAD PENCE DAN THEN SHAD  
 JOT THAW CHOP JAWS GOT  
 GALIZE NOON BOWL TOOL FORE MOON DOLE  
 KEY GILL YIELD HIT TEA DILL  
 NAP RED GNAT REST RAP NEO

PAGE 3

PAN BOR TOOT PEST FAN  
 FAULT JOCK TAUNT BOND VAULT CHOCK  
 DUES NOTE ROOT MOAN NEWS DOTE  
 VEE THICK SHFET VJLL BEE TICK  
 THANK CARE CAR GUEST SANK CHAIR  
 WAD BONG POT FOUGHT ROD DONG  
 COOP SO RUE ROAST POOP SHOW YOU  
 RIP NFATH SAID FAST DENSE WREATH  
 TENSF CALF DAW DOCK MOBS GAFF  
 BOSS BOMB THOES THOSE POOH DOUGH  
 FOO THOUGH SHOES CHEEP THING THEE JILT  
 ZEE GILT RANK NET THAD PENT  
 HOP WALL GOT TAUGHT FOP YANL  
 RODE ROOSE ROSE RUDE NODE NOOSE  
 GIN FEEL DINT PFEN CHIN VEAL  
 BEND NAB DECK MA'D MEND DAB  
 SHAW BN THONG BX CHAW VON  
 GOOSE SOLE COO JOE JUICE THCLE  
 PEKF FIN WEED BID TEAK THIN  
 BAT KEG SAG VEN GAT PEG  
 NOT RAW KNOB WROUGHT ROT GNAW  
 COAT TIINF FOAL SUE GOAT DUNE  
 HIT BEET NIP DEED BIT MEET  
 BEN CHAD PENCE DAN THEN SHAD  
 JOT THAW CHOP JAWS GOT  
 GALIZE NOON BOWL TOOL FORE MOON DOLE  
 KEY GILL YIELD HIT TEA DILL  
 NAP RED GNAT REST RAP NEO

PAGE 4

TEST PAN  
 FAULT CHOCK  
 DUES DOTE  
 VEE TICK  
 THANK CHAIR  
 WAD DONG  
 COOP SHOW YOU  
 RIP WREATH  
 TENSF DENSE GAFF  
 BOSS MOBS MOM  
 FOO THOSE POOH DOUGH  
 ZEE CHEEP THEE JILT  
 HOP NET THAD PENT  
 RODE GOT YANL  
 GIN ROSE RUDE NODE NOOSE  
 BEND DINT PFEN CHIN VEAL  
 SHAW DECK MA'D MEND DAB  
 GOOSE THONG BX CHAW VON  
 PEKF COO JOE JUICE THCLE  
 BAT WEED BID TEAK THIN  
 NOT SAG VEN GAT PEG  
 COAT KNOB WROUGHT ROT GNAW  
 HIT FOAL SUE GOAT DUNE  
 BEN NIP DEED BIT MEET  
 JOT DAN THEN SHAD  
 GALIZE CHOP JAWS GOT  
 NOON BOWL TOOL FORE MOON DOLE  
 KEY GILL YIELD HIT TEA DILL  
 NAP RED GNAT REST RAP NEO

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PAGE 1

BOB	TOOT
DAUNT	BOND
HOOT	MOAN
CHEAT	VILL
JAB	JEST
POT	THOUGHT
GHOST	COOP
NILL	NEAP
SAYD	VAST
GNAW	KNOCK
CHOOSE	DOZE
CHEEP	SING
SANK	MET
GOT	CAUGHT
ROSE	RUDE
DINT	PEEN
DECK	MAD
THONG	VOX
CHEW	JOE
WEED	OIO
SAG	YEN
KNOB	WRUGHT
FOAL	ZOO
DIP	DEED
FENCE	DAN
SAW	COP
TOOL	THOR
YIELD	FIT
GNAT	NEST

PAGE 2

PEST	FAN
FAULT	CHOCK
DOES	DOE
VEE	TICK
THANK	CARE
ROD	SONG
SO	RUE
RIP	WREATH
DENSE	CALP
BOSS	BOMB
FOO	THOUGH
THEE	GILT
THAD	TENT
FOP	WALL
NOOE	NOOSE
CHIN	VEAL
MEND	DAB
CHAN	BON
GOOSE	THOLE
TEAK	FIN
GAT	PEG
ROT	GNAW
GOAT	TUNE
HIT	MEET
DEN	SHAD
GAUZE	JOT
MOON	BOWL
TEA	GILL
RAP	RED

PAGE 3

GOB	COOT
TAUNT	POUND
ROOT	BONE
SHEET	BILL
GAB	GUEST
TOT	FOUGHT
ROAST	POOP
RILL	REAP
ZED	FAST
RAW	DOCK
SHOES	THOSE
KEEP	THING
DANK	NET
DOT	TAUGHT
NOSE	NUDE
TINT	BEAN
NECK	BAD
TONG	BOX
COO	GO
REED	BID
SHAG	WREN
ROB	NOUGHT
VOLE	SUE
NIP	NEED
PENCE	THAW
THAW	FORE
POOL	WIELD
RAT	REST

PAGE 4

TEST	PAN
VAULT	JOCK
NEWS	NOTE
BEE	THICK
SANK	CHAIR
WAD	DONG
SHOW	YOU
NIP	NEATH
TENSE	GAFF
MOSS	MOM
POOH	DOUGH
ZEE	JILT
FAO	PENT
HOP	YAWN
RODE	ROOSE
GIN	PEEL
BEND	NAB
SHAW	VON
JUICE	SOLE
FEEK	THIN
BAT	KEG
NOT	RAW
COAT	DUNE
BIT	BEET
THEN	CHAD
JAWS	GOT
NOON	DOLE
KEY	DILL
NAP	NED

DIAGNOSTIC RHYME TEST

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PAGE 1

GOB  
DAUNT  
MOOT  
SHEET  
GAB  
TOT  
BOAST  
MILL  
ZED  
DAH  
SHOES  
CHEEP  
DANK  
BOT  
NOSE  
DINT  
NECK  
THONG  
CHEW  
REED  
SAG  
KNOB  
FOAL  
NIP  
PENCE  
SAW  
TOOL  
YIELD  
RAT

TOOT  
POND  
MOAN  
VILL  
JEST  
THOUGHT  
POOP  
NEAP  
VAST  
DOCK  
DOZE  
THING  
MET  
CAUGHT  
RJOE  
BEAN  
MAD  
VOX  
JOE  
DID  
YEN  
NOUGHT  
ZOO  
DEED  
THAN  
CHUP  
FORE  
HIT  
REST

TEST  
FAULT  
DUES  
REE  
SANK  
WAD  
SHOW  
NIP  
TENSE  
MOSS  
DOZE  
FAD  
FAD  
RODE  
CHIN  
BEND  
CHAW  
GOOSE  
PEEK  
GAT  
ROT  
GOAT  
BIT  
DEN  
GAUZE  
MOON  
TEA  
NAP

FAN  
JOCK  
DOTE  
TICK  
CARE  
BONG  
YOU  
WREATH  
CALF  
MOM  
POOH  
THEE  
JILT  
TENT  
WALL  
NOOSE  
FEEL  
BEND  
CHAW  
GOOSE  
FIN  
PEG  
RAW  
TUNF  
MEET  
CHAN  
GAT  
DALE  
DILL  
NFD

ROB  
TAUNT  
ROOT  
CHEAT  
JAR  
POT  
GHOST  
NILL  
SAID  
GNAW  
THOUGH  
KEEP  
RANK  
NET  
ROSE  
TINT  
DECK  
TONG  
FOD  
WEED  
SHAG  
ROR  
VOLE  
PIP  
PENCE  
MEET  
THAW  
POOL  
WIFLD  
GNAT

COOT  
BOND  
BONE  
BILL  
GUEST  
FOUGHT  
COOP  
REAP  
FAST  
KNOCK  
CHOOSE  
SING  
NET  
TAUGHT  
NUDE  
PEEN  
BAD  
BOX  
GO  
BID  
WREN  
WRUGHT  
SUE  
NEED  
DAN  
COP  
THOR  
FIT  
NEST

PEST  
VAULT  
NEWS  
VEE  
THANK  
ROD  
SO  
RIP  
DENSE  
BOSS  
FOO  
ZEE  
THAD  
HOP  
NODE  
GIN  
MEND  
SHAW  
VON  
JUICE  
TEAK  
BAT  
NOT  
COAT  
MIT  
THEN  
JAWS  
NUON  
KEY  
RAP

PAN  
CHOCK  
NOTE  
THICK  
CHAIR  
DONG  
RUE  
NEATH  
GAFF  
BOMB  
DOUGH  
GYLT  
PENT  
YAWL  
ROOSE  
VEAL  
NAB  
VON  
SOLE  
THIN  
KEG  
GNAW  
DUNC  
BEET  
SHAD  
JOT  
BOWL  
GILL  
RED

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PAGE 1

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BOB	COOT	PEST	PAN	GOR	TOOT	TEST	FAN
DAUNT	POND	FAULT	JOCK	TALINT	BOND	VAULT	CHOCK
HOOT	BONE	DUES	NOTE	ROOT	MOAN	NEWS	DOSE
SHEET	BILL	BEE	THICK	CHEAT	VILL	VEE	TICK
GAB	JEST	BANK	CARE	JAR	GUEST	THANK	CHAIR
POT	FOUGHT	ROD	DONG	TOT	THOUGHT	WAD	BONG
GHOSH	POOP	SO	YOU	ROAST	COOP	SHOW	RUE
RILL	REAP	NIP	NEATH	NILL	NEAP	RIP	WRATH
SAID	FAST	DENSE	GAFF	ZED	VAST	TENSE	CALF
DAW	DOCK	MOSS	MOM	GNAW	KNOCK	BOSS	BOMB
CHOOSE	THOSE	FOO	DOUGH	SHOES	DOZE	POOH	THOUGH
CHEEP	THING	THEE	JILT	KEEP	SING	ZEE	GILT
RANK	MET	THAO	TENT	DANK	NET	PAO	PENT
DOT	TAUGHT	HOP	YAWL	GOT	CAUGHT	POP	WALL
NOSE	RUDE	RODE	NOOSE	ROSE	NUDE	NODE	ROSE
DINT	PEEN	CHIN	VFAL	TINT	BEAN	GIN	FEEL
NECK	MAD	BEND	DAB	DECK	BAD	MEND	NAB
THONG	BOX	CHAN	VON	TONG	VOX	SHAW	BON
COO	GO	JUICE	SOLE	CHFW	JOE	GOOSE	THOLE
WEED	DID	TEAK	FIN	REFD	BIO	PEEK	THIN
SHAG	WREN	BAT	KFG	SAG	VEN	GAT	PEG
ROB	WDROUGHT	NOT	GNAW	KNOB	NDUGHT	ROT	RAW
VOLE	SUE	COAT	DUNE	FOAL	ZOO	GOAT	TUNE
NIP	DEED	BIT	MEET	DIP	NEED	HIT	BEET
PENCE	THAN	THEN	CHAD	FENCE	DAN	DEN	SHAD
THAW	CHOP	JAWS	PAT	SAW	COP	GAUZE	JOT
TOOL	FORE	MOON	DOLE	POOL	THCR	NOON	BOWL
WIELD	HIT	KEY	DILL	YIELD	FIT	TEA	GILL
RAT	REST	NAP	NED	GNAT	NEST	RAP	RED

DIAGNOSTIC RHYME TEST

WORD LIST  
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PAGE 1

BOB	TOOT
DAUNT	BOND
HOOT	HOAN
CHEAT	BILL
JAB	GUEST
TOT	FOUGHT
BOAST	POOP
RILL	NEAP
ZOO	VAST
DAW	DOCK
SHOES	DOZE
KEEP	THING
DANK	NET
GOT	TAUGHT
NOSE	RUDE
TINT	PEEN
NECK	BAD
THONG	VOX
COO	JOE
REED	OIO
SAG	YEN
KNOB	WRUGHT
FOAL	SUE
DIP	NEED
FENCE	DAN
SAW	COP
TOOL	FORE
YIELD	HIT
RAT	NEST

PAGE 2

PEST	FAN
FAULT	CHOCK
DUES	DATE
VEF	THICK
THANK	CHAIR
WAD	DONG
SHOW	YOU
NIP	WREATH
TENSE	CALF
HOSS	MOM
DOOH	THOUGH
ZEE	JILT
FAD	PENT
POP	YAWN
RODE	NOOSE
GIN	VEAL
BEND	NAB
CHAN	BON
JUICE	THOLE
PEEK	FIN
GAT	PEG
ROT	GNAW
GOAT	DUNE
HIT	BEET
DEN	SHAD
GAUZE	JOY
MOON	DOLE
TEA	DILL
NAP	RED

PAGE 3

BOB	COOT
TAUNT	POOD
BOOT	BONE
SHEET	VILL
GAB	JEST
POT	THOUGHT
GHOSH	COOP
NILL	REAP
SAID	PAST
GNAW	KNOCK
CHOOSE	THOSE
CHEEP	SING
RANK	MET
DOT	CAUGHT
ROSE	NUDE
DINT	BEAN
DECK	MAD
TONG	BOX
CHEN	GO
WEED	BID
RHAG	WREN
ROR	WRUGHT
VOLE	ZOO
NIP	DEED
PENCE	THAW
POOL	CHOP
WIELD	THOR
GNAT	FIT
	REST

PAGE 4

TEST	PAN
VAULT	JOCK
NEWS	NOTE
REF	TICK
SANK	CARE
ROD	BONG
SO	RUE
RIP	NEATH
DENSE	GAFF
BOSS	BOMB
FOO	DRUGH
THEE	GILTY
THAO	TENT
HOP	WALL
NODE	ROOSE
CHIN	FEEL
HEND	DAB
SHAW	VON
GOOSIE	SOLE
TEAK	THIN
BAT	KEG
NOT	RAW
COAT	TUNE
BIT	MEET
THEN	CHAD
JAWS	GOT
NOON	BOWL
KEY	GILL
RAP	NEO

DIAGNOSTIC RHYME TEST

WORD LIST  
315A

PAGE 1

ROB	COOT
TAUNT	POUND
BOOT	BONE
SHEET	BILL
JAR	GUEST
PCT	FOUGHT
BOAST	COOP
HILL	REAP
SAYD	FAST
DAN	KNOCK
SHOES	THOSE
CHEEP	SING
RANK	MET
DOT	TAUGHT
ROSE	NUDE
DINT	BEAN
NECK	BAD
TONG	VOK
COO	JOE
WEED	BIO
SHAG	WREN
ROB	WRUGHT
VOLE	SUE
DIP	DEED
PENCE	THAN
THAW	CHOP
TOOL	FORE
WIELD	HIT
RAT	REST

PAGE 2

PEST	PAN
VAULT	JOCK
NEWS	NOTE
REF	THICK
THANK	CHAIR
ROD	DONG
BLOW	RUE
RIP	NEATH
DENSE	GAFF
Moss	BAHB
POOH	DOUGH
THEE	GILT
THAD	TENT
HOP	YAWL
NODE	ROGUE
BEAN	CHIN
BAD	BEND
VOK	SHAW
JOE	JUICE
BIO	TEAK
WREN	BAT
WRUGHT	NOT
SUE	COAT
DEED	HIT
THAN	THEN
CHOP	JANS
FORE	MOON
HIT	KEY
REST	NAP

PAGE 3

GOR	TOOT
DAUNT	BOND
HOOT	HOAN
CHEAT	VILL
GAB	JEST
TOY	THOUGHT
GHOST	POOP
RILL	NEAP
ZED	VAST
GNAW	DOCK
CHOOSE	DOZE
KEEP	THING
DANK	NET
GOY	CAUGHT
NOSE	RIDE
FEEL	TINT
NAB	DECK
BON	THONG
THOLE	CHEW
TEAK	REFO
KEG	SAG
GNAW	KNOB
COAT	DUNE
HIT	MEET
THEN	CHAO
JANS	GOT
MOON	DOLE
KEY	DILL
NAP	NFO

PAGE 4

TEST	PAN
FAULT	CHOCK
DOES	DOZE
VEE	TICK
SANK	CARE
WAD	BONG
SO	YOU
NIP	WREATH
TENSE	CALP
BOSS	MON
FOO	THOUGH
ZEE	JILT
FAD	PENT
POP	WALL
RODE	NOOSE
GIN	VEAL
MEND	DAB
CHAN	VON
GOOSE	SOLE
PEEK	FIN
YEN	GAT
ROT	PEG
GOAT	RAW
BIT	TUNE
DEN	BEET
GAUZE	SHAD
NOON	JOT
TEA	BOWL
RAP	GILL
	RED

DIAGNOSTIC RHYME TEST

WORD LIST  
316A

PAGE 1

BOB	COOT
TAUNT	POND
BOOT	BONE
SHEET	BILL
JAR	JEST
TOT	THOUGHT
BOABY	COOP
NILL	REAP
ZEO	VAST
GNAW	KNOCK
SHOES	DOZE
KEEP	THING
DANK	MET
DOT	CAUGHT
ROSE	RUDE
TINT	BEAN
DECK	BAD
THONG	BOX
CHEW	GO
REED	BIO
SAG	YEN
KNOB	WROUGHT
FOAL	SUE
DIP	DEED
FENCE	DAN
SAW	CHOP
POOL	FORE
YIELD	FIT
RAT	NEST

PAGE 2

PEST	PAN
VAULT	JOCK
NEWS	NOTE
BEE	THICK
THANK	CARE
WAD	BONG
SHOW	RUE
RIP	NEATH
TENSE	CALF
BOSS	BOMB
POOH	THOUGH
ZEE	JILT
FAD	TENT
HOP	WALL
NODE	NOOSE
GIN	FEEL
MEND	NAB
CHAW	VON
GOOSE	SOLE
PEEK	THIN
GAT	PEG
ROT	GNAW
GOAT	DUINE
HIT	MEET
DEN	SHAD
GALIZE	GOT
NOON	DOLF
TEA	GILL
NAP	RED

PAGE 3

GOB	TOOT
DAUNT	BOND
MOOT	NOAN
CHEAT	VILL
GAB	GUEST
POT	FOUGHT
HOST	POOP
RILL	NEAP
SAID	FAST
DAN	DOCK
CHOSE	THOSE
CHEEP	SING
RANK	NET
GOT	TAUGHT
NUDE	NUDE
DINT	PEEN
NECK	HAO
TONG	VOX
COO	JOE
HEED	DIO
SMAG	WREN
ROB	NOUGHT
VOLE	ZOO
NIP	NEED
PENCE	THAN
THAW	COP
TOOL	THOR
WIELD	HIT
GNAT	REST

PAGE 4

TEST	FAN
FAULT	CHOCK
DUES	DOYE
VEE	TICK
SANK	CHAIR
ROD	DONG
SO	YOU
NIP	WREATH
DENSE	GAFF
MOSS	MOM
FOO	DOUGH
THEE	GILT
THAO	PENT
POP	YAWL
RODE	ROOSE
CHIN	VEAL
BEND	DAB
SHAW	BON
JUICE	THOLE
TEAK	FIN
BAT	KEG
NOT	RAW
COAT	TUNE
BIT	BEET
THEN	CHAD
JAWS	JOT
MOON	BOWL
KEY	DILL
RAP	NED

DIAGNOSTIC RHYME TEST

WORD LIST  
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PAGE 1

GOB	COOT
TAUNT	BOND
MOOT	BONE
CHEAT	VILL
GAB	JEST
TOT	THOUGHT
ROAST	POOP
NILL	NEAP
ZED	FAST
GNAW	KNOCK
SHOES	DOZE
KEEP	SING
BANK	NET
GOT	TAUGHT
ROSE	RUDE
DINT	PEEN
NECK	BAD
TONG	BOX
CHEW	GO
REED	DID
SAG	VEN
KNOB	WRUGHT
VOLE	ZOO
DIP	NEED
PENCIL	TKAN
THAW	COP
POOL	THOR
YIELD	HIT
RAT	REST

PAGE 2

TEST	PAN
VAULT	CHOCK
DUES	NOTE
VER	TICK
BANK	CARE
WAD	BONG
SHOW	YOU
RIP	WREATH
TENSE	GAFF
BOSS	BOMA
POOH	THOUGH
ZEE	GILT
THAD	PFNT
FOP	YANL
NOOE	NOOSE
CHIN	VEAL
REND	NAB
SHAW	VON
GORSE	SOLE
PEEK	PIN
GAT	PEG
ROT	GNAW
COAT	TUNE
HIT	BEET
THEN	CHAD
JAWS	JOT
MOON	BOWL
TEA	DILL
NAP	NED

PAGE 3

DAUNT	ROOT
ROOT	SHEET
BILL	JAR
FOUGHT	POT
COOP	GHOST
REAP	PILL
VAST	SAID
DOCK	DAW
FOO	CHOOSE
THEE	CHEEP
FAD	DANK
HOP	NOT
RODE	NUDE
GIN	TINT
MEND	BEAN
CHAW	DECK
THOLE	NOSE
TEAK	TINT
BAT	MAID
KEG	VOX
NOT	WREN
GOAT	ROD
DUNE	NOUGHT
MEET	WEED
SHAD	RHAG
GOT	FOAL
DOLE	DEED
GILL	DAN
RED	CHOP
KEY	FORE
RAP	NEST

PAGE 4

PEST	FAN
FAULT	JOCK
NEWS	DOYE
BEE	THICK
THANK	CHAIR
ROD	DONG
SO	RUE
NIP	NEATH
DENSE	CALF
MOSS	MOM
FOO	DOUGH
JILT	JILT
TENT	TENT
HOP	WALL
RODE	ROOSE
GIN	FEEL
MEND	DAB
CHAW	BON
THOLE	THOLE
TEAK	TWIN
BAT	KEG
NOT	RAW
GOAT	DUNE
BIT	MEET
DEN	SHAD
GAUZE	GOT
MOON	DOLE
KEY	GILL
RAP	RED

DIAGNOSTIC RHYME TEST

WORD LIST  
317A

PAGE 1	PAGE 2	PAGE 3	PAGE 4
GOB	TOOT	TEST	FAN
DAUNT	POND	FAULT	JOCK
HOOT	HOAN	DOES	DATE
CHEAT	BILL	VEE	THICK
GAB	JEST	SANK	CARE
TOT	FOUGHT	HAD	DONG
BOAST	POOP	SHOW	YOU
RILL	NEAP	NIP	WREATH
ZED	FAST	TENSF	GAFF
GNAN	KNOCK	BOSB	BOMB
SHOES	DOZE	POOH	THOUGH
KEEP	THING	ZEE	JILT
DANK	NET	FAD	PENT
GOT	TAUGHT	POP	YAWL
NOSE	RUDE	RODE	NOOSE
DINT	BEAN	CHIN	PEEL
DECK	BAD	MEND	NAB
THONG	VOX	CHAN	BON
COO	JOE	JUICE	THOLE
REFED	OIO	PEEK	FIN
SHAG	WREN	BAT	KEG
KNOB	NOUGHT	ROT	RAW
VOLE	SUE	COAT	DINE
DIP	DEED	HIT	MEET
PENCE	THAN	THEFN	CHAN
SAW	CHOP	GAUZE	GOT
TOOL	THOR	MOON	BOWL
WIELD	HIT	KEY	DILL
RAT	NEST	NAP	RFD
			COOT
			TAUNT
			ROOT
			SHRET
			JAB
			POT
			GHOST
			COOP
			NILL
			SAID
			DAW
			CHOOSE
			TINT
			NECK
			TONG
			CHEW
			WEFO
			BAG
			RAW
			ROB
			FOAL
			NIP
			FENCE
			THAW
			GOT
			POOL
			VIFLD
			GNAT
			PEST
			VAULT
			NEWS
			BEE
			VILL
			THOUGHT
			ROD
			SO
			REAP
			VAST
			DOCK
			CHOOSE
			THOSE
			SING
			PEEN
			NECK
			BOX
			GO
			BID
			YEN
			WROUGHT
			ZOO
			NEED
			DAN
			THAW
			COP
			FORE
			FIT
			REST
			PAN
			CHAIR
			NEATH
			CALF
			MOM
			DOUGH
			GILT
			TENT
			WALL
			ROOSE
			VEAL
			DAB
			VON
			SOLE
			THIN
			PEG
			GNAW
			TUNE
			BIT
			BEET
			SHAO
			JOT
			DOLE
			GILL
			NED

DIAGNOSTIC RHYME TEST

WORD LIST  
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PAGE 1

GOB	COOT
TAUNT	BOND
HOOT	VAULT
CHEAT	DOES
JAB	VILL
TOT	JEST
BOAST	THOUGHT
RILL	POOP
SAYD	NEAP
DAW	VAST
SHOES	DENSE
CHEEP	KNOCK
DA'K	THOSE
GOT	THING
ROSE	MET
TINT	CAUGHT
NECK	RUDE
TONG	PEEN
CHEW	BAD
REED	REN'D
SAG	VOX
ROB	SHAW
FOAL	JOE
NIP	GOOSE
PENCE	BID
THAW	PEEK
TOOL	WREN
WIELD	ROUGHT
GNAT	NOT

PAGE 2

TEST	PAN
DAUNT	CHOCK
DOE	DOE
VEF	TICK
WAD	CARE
SHOW	BOING
HIP	YOU
DENSE	WREATH
MOSS	CALF
POOH	BOOMB
THING	DOUGH
FAD	JILT
POP	TENT
NOOE	WALL
NOSE	NOSE
GIN	VEAL
REN'D	HAB
SHAW	BON
GOOSE	THOLE
PEEK	THIN
GAT	KEG
NOT	RAW
GOAT	DUNE
BIT	BEET
THEN	SHAD
JAWS	GAT
MOON	DOLE
FIT	GILL
REST	RAP

PAGE 3

ROB	TOOT
DAUNT	POND
ROOT	BONE
SHEET	BILL
GAB	GUEST
POT	FOUGHT
GHOSH	COOP
NILL	REAP
ZED	FAST
GNAW	DOCK
CHOOSE	DOZE
KEEP	SING
RANK	NET
DOT	TAUGHT
NOSE	NUDE
DINT	BEAN
DECK	HAD
THONG	BOX
COO	GO
WEED	DID
SHAG	YEN
KNOB	WROUGHT
VOLE	ZOO
RIP	DEED
FENCE	THAN
SAW	COP
POOL	THOR
YIELD	HIT
RAT	NEST

PAGE 4

PEST	FAN
FAULT	JOCK
NEWS	NOTE
BEE	THICK
SANK	CHAIR
ROO	DOONG
SO	RUE
RIP	NEATH
TENSE	GAFF
BOBB	MOM
FOO	THOUGH
ZEE	GILT
THAD	PENT
HOP	YAWL
RODE	ROOSE
CHIN	FEEL
HEND	DAB
CHAW	VON
JUICE	SOLE
TEAK	FIN
BAT	PEG
ROT	GNAW
COAT	TUNE
HIT	MEET
DEN	CHAD
GAUZE	JOT
NOON	BOWL
TEA	DILL
NAP	RED

DIAGNOSTIC RHYME TEST

WORD LIST  
S18A

PAGE 1	PAGE 2	PAGE 3	PAGE 4
GOS	COOT	TEST	PAN
TAUNT	FOND	VAULT	JOCK
BOOT	BONE	NEWS	NOTE
CHEAT	BILL	VEE	THICK
GAB	JEST	SANK	CARE
TOT	FOUGHT	WAD	DONG
GNOST	COOP	BO	RUE
NILL	NEAP	RIP	WREATH
SAID	VAST	DENSE	CALF
DAW	DOCK	MOSS	MOM
SHOES	THOSE	POOH	DOUGH
CHEEP	BING	THEE	GILT
DANK	NET	FAO	PENT
DOT	CAUGHT	HOP	WALL
ROSE	NUDE	NODE	ROOSE
DINT	BEAN	CHIN	FEEL
DECK	WAD	MEND	DAB
TONG	BOX	BMAW	VON
COO	GO	JUICE	SOLE
REED	DID	PEEK	FIN
BAG	YEN	GAT	PEG
KNOB	NOUGHT	ROT	RAW
FOAL	SUE	GOAT	DUNE
NIP	DEED	BIT	MEET
FENCE	DAN	DEN	SHAD
SAW	COP	GAUZE	JOT
TOOL	THOR	MOON	BOWL
YIELD	HIT	TEA	DILL
RAT	REST	NAP	NED
			GNAT
			ROB
			VOLE
			DIP
			PENCE
			THAW
			POOL
			WIELD
			GNAT
			NEST
			PEST
			FAULT
			OUES
			BEE
			THANK
			ROD
			SHOW
			NIP
			TENSE
			BOSS
			FOO
			ZEE
			THAD
			POP
			RODE
			GIN
			BEND
			NAB
			CHAN
			GOOSE
			TEAK
			BAT
			NOT
			COAT
			HIT
			THEN
			JAWS
			NOON
			KEY
			RAP
			FAN
			CHOCK
			DOYE
			TICK
			CHAIR
			BONG
			YOU
			NEATH
			GAFF
			BOMB
			THOUGH
			JILT
			TENT
			YAWL
			NOOSE
			VEAL
			NAB
			BON
			THOLE
			THIN
			KEG
			GNAW
			TUNE
			BEET
			CHAD
			GOT
			DOLE
			GILL
			RED

DIAGNOSTIC RHYME TEST

WORD LIST  
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PAGE 1

BOB	TOOT
GAUNT	POUND
BOOT	BONE
SHEET	VILL
GAB	JEST
POT	FOUGHT
HOST	POOP
NILL	REAP
ZED	VAST
DAW	DOCK
SHOES	DOZE
CHEEP	THING
DANK	MET
GOT	TAUGHT
ROSE	RUDE
TINT	BEAN
NECK	BAD
TONG	VOX
COO	JOE
REED	DID
SHAG	YEN
KNOB	WROUGHT
VOLE	ZOO
DIP	NEED
FENCE	THAN
THAW	COP
POOL	THOR
WIELD	HIT
GNAT	REST

PAGE 2

PEST	FAN
FAULT	JOCK
BONE	NOTE
VILL	TICK
JEST	BANK
POOP	CARE
REAP	ROD
VAST	SO
DOCK	YOU
DOZE	RIP
THING	TENSE
MET	MOSS
TAUGHT	POOH
RUDE	THEF
BEAN	FAD
BAD	FOP
VOX	NODE
JOE	FEEL
DID	BEND
YEN	SHAW
WROUGHT	JUICE
ZOO	PEEK
NEED	RAT
THAN	ROT
COP	COAT
THOR	MIT
HIT	DEN
REST	RAP

PAGE 3

GOR	COOT
TAUNT	BOND
HOOT	HOAN
CHEAT	BILL
JAR	GUEST
TOT	THOUGHT
ROAST	COOF
NEATH	RILL
CALF	RAID
MON	GNAW
THOUGH	CHOOSE
JILT	KEEP
TENT	RANK
YAWL	NOT
NOOSE	NOSE
FEEL	DINT
NAB	DECK
BN	THONG
THOLE	CHEW
FIN	WEFO
PEG	SAG
GNAW	ROB
TIINF	FOAL
BEET	NIP
MIT	PENCE
CHAD	SAW
JOT	TOOL
NOON	YIELD
KEY	NED
RAP	PAT

PAGE 4

TEST	PAN
VAULT	CHOCK
DUES	DOYE
VEE	THICK
THANK	CHAIR
WAD	SONG
SHOW	RUE
NIP	WREATH
DENSE	GAFF
BOSS	BOMB
FOO	DOUGH
ZEE	GILT
THAO	PENT
HOP	WALL
RODE	ROOSE
CHYN	VEAL
HEND	DAB
CHAW	VON
GO	GOOSE
BIO	SOLE
WREN	THIN
NOUGHT	KEG
NOT	RAW
GOAT	DUNE
BIT	MEET
THEN	SHAD
GAUZE	GOT
MOON	DOLE
TEA	GILL
NAP	RED

## **Appendix B**

**Diagnostic Rhyme Test  
Scoring Software  
and  
Sample Printout  
CSP-30 Implementation**

DIAGNOSTIC RHYME TEST SCORING PROGRAM  
WITH CARTRIDGE OUTPUT

CSP-3B IMPLEMENTATION

5 MAR 76

FOR INFORMATION CONCERNING THIS PROGRAM CONTACT:

CAPTAIN STEVEN MEISTER  
ESD/MCE  
HANSCOM AFB, MA 01731

TELEPHONE:  
COMM. (617) 861-4433  
AUTOVON 478-4433

WRITTEN BY STEVEN MEISTER, ESD/DCHL, HANSCOM AFB, MA 01731

NUMSUB = NUMBER OF SUBFEATURES CORRECT EACH LISTENER  
NUMT = NUMBER OF MAIN FEATURES CORRECT EACH LISTENER  
NUML = NUMBER OF LISTENERS  
NUMS = NUMBER OF SPEAKERS  
LIST = CURRENT LISTENER  
ISPKR = CURRENT SPEAKER  
IKEY = CURRENT KEY NUMBER  
NKEY = CURRENT KEY INDEX NUMBER FOR KEY ARRAY  
IPAGE = PAGE BEING SCORED  
IFEAT = INDEX FOR MAIN FEATURES  
1 = VOICING  
2 = NASALITY  
3 = SUBTENTION  
4 = SIBILATION  
5 = GRAVENESS  
6 = COMPACTNESS  
7 = EXPERIMENTAL

FEATURE ARRAY KEY:

MAIN FEATURE	PRESENT	ABSENT	
SUB FEAT PRES	(L,1,1)	(L,2,1)	L = LISTENER NUMBER
SUB FEAT ABS	(L,1,2)	(L,2,2)	
	(L,1,3)	(L,2,3)	

FEAT(19,N,M) = MEAN FOR N,M  
FEAT(20,N,M) = STANDARD ERROR FOR N,M  
FEAT(18,1,M) = MEAN FOR PRESENT + ABSENT STATE OF M  
FEAT(18,2,M) = S.E. FOR PRESENT + ABSENT STATE OF M  
TOT(1,I) = TOTAL FOR PRESENT STATE ALL FEATURES  
TOT(2,I) = TOTAL FOR ABSENT STATE ALL FEATURES  
TOT(3,I) = TOTAL FOR PRESENT + ABSENT ALL FEATURES  
WHERE I = 1 FOR MEAN  
I = 2 FOR S.E.

```

C
C
C
C PAGE(I,J,K) AND NPAGE(I,J,K)
C   I = FEATURE
C   J = 11PRESENT 21ABSENT
C   K = 11MAIN 21SUB PRES 313UB ABS
C
C
C
C   DIMENSION KEY(58,68),KEYSUB(58,2)
C   COMMON IRREP(2,29),VOIC(28,2,3),XNASAL(28,2,3),SUBT(28,2,3),
C   1 SIBIL(28,2,3),GRAV(28,2,3),COMP(28,2,3),EXPER(28,2),TOT(3,2),
C   1 ISYSTE(58),NAME(12,24),NPAGE(7,2,3),PAGE(7,2,3)
C
C   102 A KEY
C   DATA KEY/0,0,1,1,0,1,1,0,1,0,1,1,0,1,4*0,
C   1 1,1,10*0,1,1,0,1,3*0,1,0,3*0,1,1,0,1,0,1,1,0,
C
C   102 B KEY
C   1 1,0,1,1,0,1,0,0,4*1,0,1,0,0,1,3*0,4*1,
C   1 0,1,0,1,1,0,0,0,0,1,1,0,0,1,0,1,1,3*0,1,1,3*0,4*1,0,
C
C   103 A KEY
C   1 7*1,3*0,4*1,0,1,1,0,1,0,1,0,0,4*1,0,0,
C   1 1,1,0,0,1,1,0,1,1,5*0,1,1,0,0,3*1,0,1,3*0,1,
C
C   103 B KEY
C   1 5*1,0,1,1,0,1,0,1,1,0,5*1,0,1,0,4*1,
C   1 4*0,1,1,0,1,1,0,0,1,0,0,1,5*0,1,0,1,0,1,0,0,3*1,0,0,
C
C   104 A KEY
C   1 4*0,1,0,1,0,1,1,0,1,3*0,1,1,0,1,1,0,0,
C   1 1,0,0,1,0,0,1,0,1,3*0,1,1,0,1,3*0,3*1,0,0,1,0,5*1,3*0,1,
C
C   104 B KEY
C   1 5*1,4*0,3*1,0,0,1,1,0,1,0,4*1,0,0,1,1,
C   1 0,0,3*1,0,1,0,4*1,0,1,1,0,1,0,0,1,0,1,3*0,1,0,1,0,
C
C   105 A KEY
C   1 0,3*1,0,0,3*1,0,1,1,0,0,1,1,0,0,1,0,1,0,1,
C   1 0,1,0,1,1,0,0,1,0,0,1,1,0,0,1,1,0,10*1,5*0,5*1,
C
C   105 B KEY
C   1 0,1,0,4*1,0,1,3*0,3*1,3*0,1,0,1,1,0,1,
C   1 0,1,0,1,0,1,1,0,1,0,1,0,1,0,0,1,4*0,3*1,0,1,1,0*0,
C
C   106 A KEY
C   1 0,3*1,0,0,1,0,0,1,0,0,1,0,1,0,1,0,0,1,0,1,0,3,3*1,0,
C   1 0,0,4*1,0,1,0,1,0,1,6*0,3*1,0,1,0,0,3*1,0,
C
C   106 B KEY
C   1 3*1,0,1,0,0,11*1,5*0,1,3*0,1,1,
C   1 1,0,1,1,0,1,0,1,0,1,1,0,1,3*0,1,0,1,1,4*0,1,0,0,
C
C   107 A KEY
C   1 0,1,0,0,1,1,4*0,1,0,0,1,1,4*0,1,0,1,0,0,1,0,3*1,
C   1 0,0,3*1,0,0,1,1,0,0,1,0,4*1,0,3*1,0,0,1,1,0,0,1,1,
C
C   107 B KEY
C   1 1,0,1,0,1,1,0,1,1,0,0,1,0,1,0,4*1,0,1,1,0,1,1,0,1,
C   1 0,0,1,0,1,0,1,1,0,1,0,0,1,0,1,0,0,5*1,0,1,0,0,3*1,
C
C   108 A KEY

```

1 1,3\*0,3\*1,0,1,4\*0,1,0,1,0,0,1,1,0,0,1,1,0,3\*1,0,  
 1 3\*1,3\*0,3\*1,0,1,1,0,0,1,0,1,4\*0,4\*1,  
 C 108 B KEY  
 1 0,0,1,1,3\*0,3\*1,0,0,1,1,3\*0,5\*1,0,1,0,0,3\*1,  
 1 0,0,3\*1,3\*0,1,0,1,1,0,3\*1,0,3\*1,0,0,1,1,0,1,  
 C 111 A KEY  
 1 1,1,0,0,3\*1,3\*0,3\*1,0,1,0,1,0,0,1,  
 1 3\*0,3\*1,0,0,0,1,0,1,1,0,3\*0,4\*1,0,0,3\*1,0,0,1,0,1,  
 C 111 B KEY  
 1 0,0,3\*1,3\*0,1,0,1,0,1,1,4\*0,1,1,0,1,0,  
 1 3\*1,0,3\*1,0,1,0,1,7\*0,1,1,0,1,1,5\*0,1,0,0,1,0,1,1,  
 C 112 A KEY  
 1 1,3\*0,1,1,3\*0,3\*1,0,1,1,0\*0,1,5\*0,1,0,  
 1 0,1,0,0,1,5\*0,1,1,0,1,0,1,0,0,1,0,1,4\*0,4\*1,  
 C 112 B KEY  
 1 0,4\*1,0,1,0,0,1,0,0,1,0,4\*1,3\*0,1,3\*0,4\*1,  
 1 4\*0,1,0,0,4\*1,0,0,1,1,3\*0,1,1,3\*0,1,1,0,1,1,0,1,  
 C 113 A KEY  
 1 3\*0,6\*1,0,0,1,1,0,3\*1,0,0,3\*1,0,1,0,1,  
 1 0,0,1,1,0,3\*1,0,1,0,0,3\*1,0,1,0,1,1,0,4\*1,3\*0,1,0,1,1,  
 C 113 B KEY  
 1 1,0,1,1,0,0,1,0,1,1,0,1,1,0,1,0,4\*1,  
 1 0,1,0,1,0,1,0,0,4\*1,0,1,0,1,0,6\*0,1,0,3\*1,0,1,4\*0,1,  
 C 115 A KEY  
 1 1,0,1,1,0,5\*1,0,0,1,1,0,0,1,0,1,1,0,1,0,3\*1,3\*0,  
 1 0,1,0,1,3\*0,4\*1,0,4\*1,0,0,1,0,0,1,0,3\*0,1,0,1,1,  
 C 115 B KEY  
 1 4\*0,1,4\*0,3\*1,3\*0,1,1,4\*0,1,0,3\*1,3\*0,  
 1 1,1,0,0,4\*1,4\*0,3\*1,0,1,0,3\*1,0,3\*1,0,3\*1,  
 C 116 A KEY  
 1 0,4\*1,0,1,0,1,0,0,1,0,0,1,0,1,3\*0,1,0,0,1,0,1,0,1,  
 1 0,1,1,3\*0,4\*1,0,5\*1,0\*0,1,0,4\*1,0,  
 C 116 B KEY  
 1 3\*1,0,0,3\*1,5\*0,1,3\*0,1,0,1,0,1,0,1,1,0,0,1,0,0,1,0,0,  
 1 0,0,3\*1,0,0,3\*1,0,0,1,0,0,1,0,1,0,0,1,0,1,0,3\*1,  
 C 301 A KEY  
 1 0,0,1,1,1,0,0,0,1,0,0,1,0,0,0,1,1,0,1,0,1,0,0,1,1,0,1,0,0,  
 1 1,0,0,1,1,0,0,0,1,0,0,1,1,0,0,0,1,1,1,0,0,0,1,1,1,1,1,  
 C 301 B KEY  
 1 0,0,1,1,1,0,0,1,1,0,0,0,1,0,1,1,1,1,1,0,1,0,0,0,0,0,1,1,1,1,  
 1 1,1,1,0,1,1,0,0,1,0,1,1,0,0,0,1,0,1,0,0,1,0,1,0,1,0,1,  
 C 302 A KEY  
 1 0,1,0,1,0,0,1,0,1,1,1,0,0,1,1,1,0,0,1,0,0,1,0,0,1,0,1,1,  
 1 0,0,0,0,1,0,0,0,1,1,1,0,1,0,0,0,1,1,0,0,0,1,0,0,1,0,1,  
 C 302 B KEY  
 1 0,0,1,1,0,0,0,1,0,1,1,1,0,0,0,1,1,1,0,1,0,0,0,1,0,0,1,0,0,1,  
 1 0,1,1,0,0,0,1,0,1,0,1,0,0,0,1,0,1,1,0,0,0,1,0,0,1,1,0,1,  
 C 303 A KEY

```

C   1 0,0,1,0,0,1,1,0,0,1,0,0,1,0,1,0,0,0,1,0,0,0,1,1,1,1,0,0,1,
C   1 1,0,1,1,1,0,1,1,1,1,0,1,1,0,0,0,0,1,0,0,0,1,0,1,1,0,0,1,1,
C
C   303 B KEY
C   1 0,1,1,1,1,0,1,1,1,0,0,1,0,1,1,1,0,0,0,0,1,0,0,0,1,0,1,0,
C   1 0,0,1,0,1,0,0,1,0,0,1,0,1,1,0,0,1,0,0,0,1,0,0,0,1,0,0,0,
C
C   304 A KEY
C   1 0,1,1,1,1,1,1,1,0,1,1,0,1,1,1,0,1,1,0,1,1,1,0,0,0,0,0,0,
C   1 0,1,0,1,0,1,1,1,1,1,1,1,1,0,0,1,0,1,1,1,0,0,0,1,0,0,0,1,0,
C
C   304 B KEY
C   1 1,1,0,1,1,0,0,1,0,0,0,1,1,1,1,1,0,1,0,1,1,0,1,1,1,1,1,1,
C   1 0,1,1,0,0,0,1,1,0,0,1,1,0,1,0,1,0,0,0,0,0,0,0,1,0,1,
C
C   305 A KEY
C   1 0,1,0,0,1,0,1,1,0,1,1,1,0,0,1,1,1,0,0,1,0,1,1,0,1,1,0,0,0,
C   1 0,0,1,0,0,0,1,1,1,0,1,0,1,1,1,1,0,0,0,0,0,1,1,0,0,1,1,1,
C
C   305 B KEY
C   1 1,1,0,1,0,0,0,1,1,1,1,1,0,0,0,1,1,0,1,1,1,1,1,0,1,1,1,0,
C   1 1,0,1,0,1,0,1,1,1,0,1,0,1,0,0,1,0,0,1,0,0,1,0,1,0,1,1,0,1,
C
C   306 A KEY
C   1 1,1,0,1,1,1,0,1,1,1,0,1,1,0,1,1,1,0,1,1,0,0,0,1,0,1,1,1,0,
C   1 0,0,0,1,1,1,1,0,0,0,0,1,0,0,0,0,0,0,1,0,0,0,1,1,0,1,1,1,1,
C
C   306 B KEY
C   1 0,1,0,1,0,1,1,0,1,0,1,1,0,1,1,1,0,0,0,1,0,1,1,0,1,0,1,0,1,
C   1 0,1,0,1,0,1,1,0,1,1,0,0,0,1,0,1,1,0,1,1,0,1,0,1,1,1,1,1,
C
C   307 A KEY
C   1 1,1,1,0,0,0,1,1,1,0,0,1,1,0,0,1,1,1,0,0,0,1,1,1,0,1,1,0,1,1,
C   1 0,1,0,0,0,1,0,1,0,1,1,0,0,0,1,0,0,0,1,1,1,1,0,1,0,1,1,0,0,
C
C   307 B KEY
C   1 1,0,1,1,1,0,1,0,1,1,1,1,0,0,1,0,1,1,1,0,0,0,1,1,1,0,0,1,1,1,
C   1 1,1,1,0,0,0,1,1,0,1,0,1,1,1,1,0,1,1,1,0,0,1,0,0,1,0,1,0,1,0,
C
C   308 A KEY
C   1 1,0,1,0,1,0,1,0,1,1,0,0,1,1,0,1,1,0,0,1,1,1,0,0,0,0,0,0,0,0,
C   1 0,1,1,1,0,0,0,1,0,0,1,1,1,1,0,1,0,0,1,0,0,1,1,0,1,1,0,0,1,1,
C
C   308 B KEY
C   1 1,1,1,1,1,0,0,0,1,0,0,1,0,1,0,1,1,1,1,1,0,1,0,0,1,1,0,1,0,0,
C   1 0,0,0,0,0,0,0,1,0,0,1,1,0,1,0,1,0,0,0,1,0,0,1,0,0,0,0,0,0,0,
C
C   309 A KEY
C   1 1,1,0,0,1,0,0,0,1,0,0,0,0,0,0,0,0,1,0,0,0,1,0,0,1,0,1,0,0,0,
C   1 0,0,1,0,0,0,0,1,0,0,0,1,0,0,0,0,1,1,0,0,0,0,1,0,0,0,0,0,1,0,
C
C   309 B KEY
C   1 0,1,1,1,0,0,1,0,0,0,0,0,0,0,0,0,0,1,0,0,0,1,0,0,1,0,1,0,0,0,
C   1 1,0,1,0,0,1,1,0,1,0,1,1,0,1,0,1,0,1,0,1,0,1,0,1,1,0,0,0,0,0,
C
C   310 A KEY
C   1 1,0,0,1,0,0,1,1,0,1,1,0,0,1,0,0,0,0,0,1,1,1,0,0,0,1,0,0,0,1,
C   1 1,1,0,1,1,1,0,0,1,0,0,1,0,0,1,0,0,1,0,0,1,0,0,1,0,0,1,1,0,0,
C
C   310 B KEY
C   1 1,0,0,1,0,1,1,0,0,0,1,1,1,0,0,1,0,0,0,0,1,0,0,0,1,0,0,0,1,1,1,
C   1 0,0,1,1,0,1,1,1,0,1,1,0,1,0,0,1,0,0,0,1,1,0,0,0,0,0,1,0,1,0,1,
C
C   311 A KEY

```

I 1,0,1,1,1,1,0,1,0,0,0,1,0,0,1,1,0,0,1,0,0,0,1,1,1,1,1,  
 I 0,0,0,1,0,1,0,0,1,1,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,  
 C C 311 B KEY  
 I 0,1,1,1,0,1,1,1,1,0,0,1,1,0,1,0,1,0,0,0,0,0,1,1,1,1,0,0,1,  
 I 0,0,1,1,1,0,1,1,1,1,0,0,0,1,1,0,1,1,0,0,1,1,1,1,0,0,1,1,  
 C C 312 A KEY  
 I 1,1,1,0,0,0,0,1,1,1,1,0,0,0,1,0,0,0,1,1,0,1,1,1,0,0,0,1,1,  
 I 1,1,1,0,0,0,1,1,0,1,0,0,1,0,0,0,1,0,0,0,1,1,1,1,0,0,1,0,  
 C C 312 B KEY  
 I 0,1,1,0,0,0,1,0,1,0,0,0,0,0,0,0,0,0,1,0,1,0,1,0,1,0,0,1,0,  
 I 0,0,0,0,1,1,0,1,1,0,1,0,0,0,1,1,0,1,1,0,1,0,0,0,1,0,1,0,  
 C C 313 A KEY  
 I 0,0,0,1,0,0,0,1,1,0,0,1,1,1,1,0,1,0,1,0,1,0,0,0,1,1,0,0,1,1,  
 I 0,1,1,1,0,1,0,1,0,1,0,0,1,0,0,0,1,0,1,1,1,0,0,0,1,1,1,0,  
 C C 313 B  
 I 1,0,0,1,0,0,0,1,1,0,1,0,0,0,1,0,1,0,1,0,0,0,1,1,0,0,1,0,0,  
 I 1,0,0,0,0,1,0,0,0,1,0,0,0,1,1,0,0,0,1,0,0,0,1,1,1,1,0,  
 C C 314 A KEY  
 I 0,0,0,0,1,1,1,0,0,1,0,0,1,0,0,0,0,0,1,1,0,1,0,1,0,0,0,1,0,1,  
 I 1,1,0,0,0,1,1,0,0,1,1,1,0,0,1,0,0,0,0,1,0,1,0,1,0,0,0,0,1,  
 C C 314 B KEY  
 I 1,0,0,0,1,0,0,0,1,1,1,0,0,1,0,0,0,0,1,0,0,1,0,1,1,1,1,1,1,  
 I 0,1,1,1,0,0,0,1,1,1,0,1,0,1,1,0,1,1,1,0,1,1,1,0,0,0,0,1,  
 C C 315 A KEY  
 I 1,0,0,1,0,1,1,0,0,1,0,1,1,0,0,1,0,0,1,1,1,0,1,1,0,0,1,0,1,  
 I 1,0,0,1,1,0,1,0,1,0,1,1,1,1,1,1,0,0,1,0,0,1,0,1,0,0,0,0,0,  
 C C 315 B KEY  
 I 1,1,1,0,0,0,1,1,1,0,0,0,1,1,0,0,0,1,1,0,0,1,0,1,1,1,1,1,1,  
 I 0,1,1,1,1,0,0,1,1,0,0,1,0,0,0,1,0,0,1,0,0,1,0,1,1,0,0,0,0,1,  
 C C 316 A KEY  
 I 1,1,1,0,0,1,1,1,1,0,0,0,1,1,1,1,1,1,0,0,1,1,0,1,1,0,0,0,0,1,  
 I 0,1,1,1,1,0,1,0,1,0,0,1,1,0,0,1,0,1,1,0,0,0,0,1,1,1,0,0,0,1,  
 C C 316 B KEY  
 I 0,1,0,1,1,1,1,0,0,0,1,0,0,1,0,0,0,1,0,1,0,1,1,0,0,1,1,0,0,1,  
 I 0,0,1,0,0,1,1,0,1,0,1,1,1,1,1,1,1,0,0,0,0,1,0,1,0,0,0,1,  
 C C 317 A KEY  
 I 0,0,0,1,1,1,1,0,0,0,0,0,1,1,0,0,0,1,0,1,1,0,0,0,1,1,0,1,1,1,  
 I 1,1,0,1,0,0,1,0,1,0,1,1,1,1,0,1,0,0,1,1,1,1,0,0,1,0,0,1,0,0,  
 C C 317 B KEY  
 I 0,1,0,1,0,1,1,0,1,1,0,0,1,0,1,1,0,1,0,1,1,1,0,1,1,1,1,0,1,1,1,  
 I 0,0,0,0,1,1,0,0,0,1,0,0,1,1,1,0,0,0,1,1,0,1,1,1,0,1,0,0,1,1,  
 C C 318 A KEY  
 I 0,1,1,1,1,1,0,1,1,1,0,0,1,1,1,0,1,1,1,1,1,0,1,0,0,0,1,0,1,0,1,  
 I 0,1,1,1,0,0,0,0,0,1,0,0,1,0,0,0,0,1,0,1,1,0,1,1,1,1,1,0,1,  
 C C 318 B KEY  
 I 1,0,1,0,1,0,0,0,1,0,1,0,0,1,0,1,1,0,1,1,1,0,0,0,1,0,1,0,1,  
 I 1,1,1,0,0,0,1,1,0,1,1,0,1,0,1,0,1,0,0,1,0,0,0,0,1,1,0,1,  
 C C SUB FEATURES KEY

```

1 DATA KEYSUB/0,0,1,0,1,0,3+0,1,1,5+0,1,0,1,1,4+0,1,3+0,3+1,
1 3+0,1,0,1,0,1,3+0,7+1,0,1,4+0,1,1,0,1,3+0,1,0,1,3+0,1,1,
1 0,1,0,1,1,0,4+1,3+0,1,3+0,3+1,0,3+1,0,3+0,1,0,4+1/
1 CRCT(X,Y) = (2.+X/Y - 1.)*100,
1 SE(X,Y,Z) = SQRT((X/Z+Y*Y)/Z)
1 DO 1 I=1,20
1 DO 1 J=1,2
1 EXPER(I,J)=0,
1 DO 1 K=1,3
1 VUIC(I,J,K)=0,
1 XNASAL(I,J,K)=0,
1 SUST(I,J,K)=0,
1 SIBIL(I,J,K)=0,
1 GRAY(I,J,K)=0,
1 COMP(I,J,K)=0,
1 CONTINUE
1 DO 315 I=1,3
1 DO 315 J=1,2
315 TOT(I,J)=0,
315 02420,0116000,014
315 WHITE(6,270)
315 FFORMAT(30X,'DIAGNOSTIC RHYME TEST!//')
315 WRITE(6,271)
315 FFORMAT('LISTENER SUMMARIES!')
315 02400,0116000,014
315 WHITE(5,100)
315 FFORMAT('' DIAGNOSTIC RHYME TEST SCORING!'')
315 WRITE(5,600)
315 FFORMAT('' INSERT 150 FT CARTRIDGE IN UPPER DECK!/
1 1/U RESET + CONTINUE!'')
1 PAUSE
1 WRITE(5,1000)
1 FFORMAT('' SYSTEM UNDER TEST?''/1 1,50(1S))
1 READ(5,1001)(ISYTE(I),I=1,50)
1 FFORMAT(50A1)
1 WRITE(5,101)
1 FFORMAT('' HOW MANY LISTENERS?''/1 LL)
1 READ(5,102)NUML
1 FFORMAT(12)
1 WRITE(5,103)
1 FFORMAT('' HOW MANY SPEAKERS?''/1 SS)
1 READ(5,102)NUMS
1 NUMT = 16*NUMS
1 NUMSUB = 8*NUMS
1 WRITE(7,601)(ISYTE(I),I=1,50),NUML,NUMS
1 FFORMAT(50A1,2I3)
1 DU 200 LIST = 1,NUML
1 WRITE(6,3001)
1 WRITE(6,3000)(ISYTE(I),I=1,50)
1 FFORMAT(/50A1)
30001 FFORMAT('' '')
30001 WRITE(5,2000)LIST
30000 FFORMAT('' LISTENER!,I3,' NAME!''/1 24('N'))
30000 READ(5,2001)(NAME(LIST,J),J=1,24)
30001 FFORMAT(24A1)
30001 WRITE(6,275)LIST,(NAME(LIST,J),J=1,24)
30001 WRITE(7,2001)(NAME(LIST,J),J=1,24)
1 DU 201 ISPKR = 1,NUMS
1 DO 610 I=1,7
1 DO 610 J=1,2
1 DO 610 K=1,3
610 PAGE(I,J,K) = 0,R
10/ 10/ WRITE(5,104)LIST,18PKH

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```

104  FORMAT(/'FOR LISTENER',I3,' SPEAKER',I3//)
      IENTER KEY NUMBER AND LETTER/I' NNNL')
READ(5,105)IKEY,LETTER
FORMAT(I3,A1)
470 FORMAT(/'BX,1***!,1BX,1**!/IKEY = I,I3,A1,
      I' 5X,'SPEAKER IS I,A2/BX,1***!,1BX,1**!/IF OK ENTER B/')
470 FORMAT(I1)
IF(IKEY,EQ,102)NKEY = 10MSPK='BV'@GOTO 150
IF(IKEY,EU,103)NKEY = 30MSPK='BV'@GOTO 150
IF(IKEY,EU,104)NKEY = 50MSPK='RD'@GOTO 150
IF(IKEY,EU,105)NKEY = 70MSPK='RD'@GOTO 150
IF(IKEY,EQ,106)NKEY = 90MSPK='BL'@GOTO 150
IF(IKEY,EQ,107)NKEY = 110MSPK='CH'@GOTO 150
IF(IKEY,EQ,108)NKEY = 130MSPK='CH'@GOTO 150
IF(IKEY,EQ,111)NKEY = 150MSPK='JE'@GOTO 150
IF(IKEY,EQ,112)NKEY = 170MSPK='SN'@GOTO 150
IF(IKEY,EQ,113)NKEY = 190MSPK='JE'@GOTO 150
IF(IKEY,EU,115)NKEY = 210MSPK='SN'@GOTO 150
IF(IKEY,EU,116)NKEY = 230MSPK='BL'@GOTO 150
IF(IKEY,GT,318)GOTO 181
IF(IKEY,GT,380)NKEY = 25+2*(IKEY-301)@GOTO 150
GOTO 151
150 IF(LETTER,EQ,'B')NKEY = NKEY+1@GOTO 192
IF(LETTER,EQ,'A')GOTO 152
151 WRITE(5,106)IKEY,LETTER
106 FORMAT(/'***** NO KEY',I4,A1,' *****//')
GOTO 107
152 CONTINUE
IF(IKEY,LT,117)GOTO 700
WRITE(5,701)
701 FORMAT(/'SPEAKER ?'/' 33')
READ(5,702)MSPK
702 FORMAT(A2)
700 WRITE(5,475)IKEY,LETTER,MSPK
READ(5,476)KEYCHK
IF(KEYCHK,NE,0)GOTO 107
WHITE(6,200)MSPK,IKEY,LETTER
200 FORMAT(21X,A2,7X,I3,A1)
DO 110 IPAGE = 1,4
350 WHITE(5,108)IKEY,LETTER,LIST,IPAGE
108 FORMAT(/'FOR KEY',I4,A1,' LISTENER',I3,' PAGE',I2//)
      I' ENTER RESPONSE BY COLUMN#1/I' 1 = FIRST WORD 2 = SECOND WORD//'
      I' RRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRR')
DO 112 I=1,2
112 READ(5,111)(IRESP(I,J),J=1,29)
111 FORMAT(29I1)
CALL CHECK($350)
DO 202 I=1,2
DO 202 J=1,29
202 IRESP(I,J)=IRESP(I,J)+1
DO 203 ICOL=1,2
DO 204 IRON=1,29
C ESTABLISH FEATURE BEING SCORED
IF(IRON,LE,8)IFEAT=IRON+1
ITEMP = IRON+1
IFEAT=MOD(ITEMP,7)
IF(IFEAT,EU,0)IFEAT=7
C ESTABLISH WHICH COLUMN PRESENT STATE OF FEATURE IS IN.
IPRES=1
IF(IPAGE,LE,2)IPRES=0
C FIND KEY ELEMENT
KEYEL=IRON
IF(ICOL,EU,2)KEYEL=IRON+29
INDEX = 2

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IF(IPAGE,EQ,1)GOTO 298
IF(IPAGE,EQ,3)GOTO 298
IF(KEY(KEYEL,NKEY),NE,IPRES)INDEX=1
GOTO 299
298 IF(KEY(KEYEL,NKEY),EQ,IPRES)INDEX=1
INDEX #1 IMPLIES MAIN FEATURE PRESENT; 2 IMPLIES ABSENT.
SCORE THE RESPONSE
299 ANSWER = 0.8
IF(IPAGE,EQ,1)GOTO 295
IF(IPAGE,EQ,3) GOTO 295
IF(KEY(KEYEL,NKEY),NE,IRESP(ICOL,IROW))ANSWER=1.0
GOTO 296
295 IF(KEY(KEYEL,NKEY),EQ,IRESP(ICOL,IROW))ANSWER=1.0
CONTINUE
IF(IFEAT,EQ,7)GOTO 257
ISUBP=2
NSUBP=2
IF(IPAGE,EQ,1)ISUBP=1
IF(IPAGE,EQ,3)ISUBP=1
IF(KEYSUB(KEYEL,ISUBP),EQ,0)NSUBP=3
GOTO(251,252,253,254,255,256),IFEAT
251 VOIC(LIST,INDEX,1)=VOIC(LIST,INDEX,1)+ANSWER
VOIC(LIST,INDEX,NSUBP)=VOIC(LIST,INDEX,NSUBP)+ANSWER
PAGE(1,INDEX,1)=PAGE(1,INDEX,1)+ANSWER
PAGE(1,INDEX,NSUBP)=PAGE(1,INDEX,NSUBP)+ANSWER
GOTO 260
252 XNASAL(LIST,INDEX,1)=XNASAL(LIST,INDEX,1)+ANSWER
XNASAL(LIST,INDEX,NSUBP)=XNASAL(LIST,INDEX,NSUBP)+ANSWER
PAGE(2,INDEX,1)=PAGE(2,INDEX,1)+ANSWER
PAGE(2,INDEX,NSUBP)=PAGE(2,INDEX,NSUBP)+ANSWER
GOTO 260
253 SUST(LIST,INDEX,1)=SUST(LIST,INDEX,1)+ANSWER
SUST(LIST,INDEX,NSUBP)=SUST(LIST,INDEX,NSUBP)+ANSWER
PAGE(3,INDEX,1)=PAGE(3,INDEX,1)+ANSWER
PAGE(3,INDEX,NSUBP)=PAGE(3,INDEX,NSUBP)+ANSWER
GOTO 260
254 SIBIL(LIST,INDEX,1)=SIBIL(LIST,INDEX,1)+ANSWER
SIBIL(LIST,INDEX,NSUBP)=SIBIL(LIST,INDEX,NSUBP)+ANSWER
PAGE(4,INDEX,1)=PAGE(4,INDEX,1)+ANSWER
PAGE(4,INDEX,NSUBP)=PAGE(4,INDEX,NSUBP)+ANSWER
GOTO 260
255 GHAV(LIST,INDEX,1)=GRAV(LIST,INDEX,1)+ANSWER
GRAV(LIST,INDEX,NSUBP)=GRAV(LIST,INDEX,NSUBP)+ANSWER
PAGE(5,INDEX,1)=PAGE(5,INDEX,1)+ANSWER
PAGE(5,INDEX,NSUBP)=PAGE(5,INDEX,NSUBP)+ANSWER
GOTO 260
256 COMP(LIST,INDEX,1)=COMP(LIST,INDEX,1)+ANSWER
COMP(LIST,INDEX,NSUBP)=COMP(LIST,INDEX,NSUBP)+ANSWER
PAGE(6,INDEX,1)=PAGE(6,INDEX,1)+ANSWER
PAGE(6,INDEX,NSUBP)=PAGE(6,INDEX,NSUBP)+ANSWER
GOTO 260
257 EXPER(LIST,INDEX)=EXPER(LIST,INDEX)+ANSWER
PAGE(7,INDEX,1)=PAGE(7,INDEX,1)+ANSWER
260 CONTINUE
264 CONTINUE
263 CONTINUE
110 CONTINUE
DO 611 I=1,7
DO 611 J=1,2
DO 611 K=1,3
611 NPAGE(I,J,K)=IFIX(PAGE(I,J,K)+.5)
WRITE(7,675)M8PK
675 FORMAT(A2)
WRITE(7,612)((NPAGE(I,J,K),I=1,7),J=1,2),K=1,3)

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612 FORMAT(I3)
201 CONTINUE
IPASS = 1
270 FORMAT(//5X,'LISTENER',I3,' SPEAKER',3X,' KEY',5X,24A1)
WRITE(6,201)
291 FORMAT(/5X,'NUMBER OF CORRECT RESPONSES!//')
303 WRITE(6,270)
276 FORMAT(10X,'MAIN ATTRIBUTE!!',18X,'PRESENT',7X,'ABSENT!//')
WRITE(6,277)(VOIC(LIST,I,1),I=1,8)
277 FORMAT(15X,'VOICING',20X,F7.2,6X,F7.2)
WRITE(6,278)(VOIC(LIST,I,2),I=1,2)
278 FORMAT(20X,'FRICITIONAL',15X,F7.2,6X,F7.2)
WRITE(6,279)(VOIC(LIST,I,3),I=1,2)
279 FORMAT(20X,'NON-FRICITIONAL',9X,F7.2,6X,F7.2)
WRITE(6,280)(XNASAL(LIST,I,1),I=1,2)
280 FORMAT(15X,'NABILITY!',10X,F7.2,6X,F7.2)
WRITE(6,281)(XNASAL(LIST,I,2),I=1,2)
281 FORMAT(20X,'GRAVE!',18X,F7.2,6X,F7.2)
WHITE(6,282)(XNASAL(LIST,I,3),I=1,2)
282 FORMAT(20X,'ACUTE!',18X,F7.2,6X,F7.2)
WRITE(6,283)(SUST(LIST,I,1),I=1,2)
283 FORMAT(15X,'SUSTENTION!',17X,F7.2,6X,F7.2)
WHITE(6,284)(SUST(LIST,I,2),I=1,2)
284 FORMAT(20X,'UNVOICED',17X,F7.2,6X,F7.2)
WRITE(6,285)(SUST(LIST,I,3),I=1,2)
285 FORMAT(20X,'SIBILATION',15X,F7.2,6X,F7.2)
WRITE(6,286)(SIBIL(LIST,I,1),I=1,2)
286 FORMAT(15X,'SIBILATION!',17X,F7.2,6X,F7.2)
WHITE(6,284)(SIBIL(LIST,I,2),I=1,2)
WHITE(6,285)(SIBIL(LIST,I,3),I=1,2)
WHITE(6,287)(GRAV(LIST,I,1),I=1,2)
287 FORMAT(15X,'GRAVENESS!',18X,F7.2,6X,F7.2)
WHITE(6,284)(GRAV(LIST,I,2),I=1,2)
WHITE(6,285)(GRAV(LIST,I,3),I=1,2)
WHITE(6,288)(COMP(LIST,I,1),I=1,2)
288 FORMAT(15X,'COMPACTNESS!',16X,F7.2,6X,F7.2)
WHITE(6,284)(COMP(LIST,I,2),I=1,2)
WHITE(6,285)(COMP(LIST,I,3),I=1,2)
IF(IPASS,EQ,2)GOTO 304
1
200 CONTINUE
X=FLOAT(NUMT)
Y=FLOAT(NUMSUB)
DO 300 L=1,NUML
DO 300 I=1,2
DO 300 J=1,3
Z=X
IF(J,GT,1)Z=Y
W=VUIC(L,I,J)
VOIC(L,I,J)=CRCT(W,Z)
W=SUST(L,I,J)
SUST(L,I,J)=CRCT(W,Z)
W=GRAV(L,I,J)
GRAV(L,I,J)=CRCT(W,Z)
W=COMP(L,I,J)
COMP(L,I,J)=CRCT(W,Z)
W=XNASAL(L,I,J)
XNASAL(L,I,J)=CRCT(W,Z)
W=SIBIL(L,I,J)
SIBIL(L,I,J)=CRCT(W,Z)
CONTINUE
IPASS=2
DO 301 LIST=1,NUML

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1     R242B,8116888,814
1     WHITE(6,3001)
1     WHITE(6,3000)(ISYSTE(I),I=1,50)
1     WRITE(6,302)LIST,(NAME(LIST,J),J=1,24)
302   FORMAT('!LISTENER!,I3,! PERCENT CORRECT WITH GUESSING!',
1     ! TRANSFORMATION!24A1//)
1     GOTO 303
304   CONTINUE
301   CONTINUE
1     DU 310 I=10,20
1     M=1
1     IF(I,EQ,20)M=2
1     Z=FLOAT(NUML)
1     IF(I,EQ,20)Z=1.0
1     DU 310 J=1,2
1     DU 310 K=1,3
1     DO 310 L=1,NUML
1     VUIC(I,J,K)=VOIC(I,J,K)+VOIC(L,J,K)**M/Z
1     XNASAL(I,J,K)=XNASAL(I,J,K)+XNASAL(L,J,K)**M/Z
1     SUST(I,J,K)=SUST(I,J,K)+SUST(L,J,K)**M/Z
1     SIBIL(I,J,K)=SIBIL(I,J,K)+SIBIL(L,J,K)**M/Z
1     GRAY(I,J,K)=GRAY(I,J,K)+GRAY(L,J,K)**M/Z
1     COMP(I,J,K)=COMP(I,J,K)+COMP(L,J,K)**M/Z
310   CONTINUE
1     Z=FLOAT(NUML)
1     DU 312 J=1,2
1     DU 312 K=1,3
1     X=VUIC(20,J,K)
1     Y=VOIC(19,J,K)
1     VOIC(20,J,K)=SE(X,Y,Z)
1     X=XNASAL(20,J,K)
1     Y=XNASAL(19,J,K)
1     XNASAL(20,J,K)=SE(X,Y,Z)
1     X=SUST(20,J,K)
1     Y=SUST(19,J,K)
1     SUST(20,J,K)=SE(X,Y,Z)
1     X=SIBIL(20,J,K)
1     Y=SIBIL(19,J,K)
1     SIBIL(20,J,K)=SE(X,Y,Z)
1     X=GRAY(20,J,K)
1     Y=GRAY(19,J,K)
1     GRAY(20,J,K)=SE(X,Y,Z)
1     X=COMP(20,J,K)
1     Y=COMP(19,J,K)
1     COMP(20,J,K)=SE(X,Y,Z)
312   CONTINUE
1     Z=FLOAT(2*NUML)
1     DU 313 J=1,3
1     DO 313 L=1,NUML
1     DU 313 K=1,2
1     VOIC(18,1,J)=VOIC(18,1,J)+VOIC(L,K,J)/2
1     XNASAL(18,1,J)=XNASAL(18,1,J)+XNASAL(L,K,J)/Z
1     SUST(18,1,J)=SUST(18,1,J)+SUST(L,K,J)/Z
1     SIBIL(18,1,J)=SIBIL(18,1,J)+SIBIL(L,K,J)/Z
1     GRAY(18,1,J)=GRAY(18,1,J)+GRAY(L,K,J)/Z
1     COMP(18,1,J)=COMP(18,1,J)+COMP(L,K,J)/Z
313   CONTINUE
1     DO 420 K=1,3
1     DU 420 L=1,NUML
1     VUIC(18,2,K)=VOIC(18,2,K)+(VOIC(L,1,K)+VOIC(L,2,K))**2/4,
1     XNASAL(18,2,K)=XNASAL(18,2,K)+(XNASAL(L,1,K)+XNASAL(L,2,K))**2/4,
1     SUST(18,2,K)=SUST(18,2,K)+(SUST(L,1,K)+SUST(L,2,K))**2/4,
1     SIBIL(18,2,K)=SIBIL(18,2,K)+(SIBIL(L,1,K)+SIBIL(L,2,K))**2/4,
1     GRAY(18,2,K)=GRAY(18,2,K)+(GRAY(L,1,K)+GRAY(L,2,K))**2/4,

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420 CUMP(18,1,K)=COMP(18,2,K)+(COMP(L,1,K)+COMP(L,2,K))*#2/4,
Z=FLOAT(NUML)
DO 311 K=1,3
X=VOIC(18,2,K)
Y=VOIC(18,1,K)
VOIC(18,2,K)=SE(X,Y,Z)
X=XNASAL(18,2,K)
Y=XNASAL(18,1,K)
XNASAL(18,2,K)=SE(X,Y,Z)
X=SUST(18,2,K)
Y=SUST(18,1,K)
SUST(18,2,K)=SE(X,Y,Z)
X=SIBIL(18,2,K)
Y=SIBIL(18,1,K)
SIBIL(18,2,K)=SE(X,Y,Z)
X=GRAY(18,2,K)
Y=GRAY(18,1,K)
GRAY(18,2,K)=SE(X,Y,Z)
X=COMP(18,2,K)
Y=COMP(18,1,K)
CUMP(18,2,K)=SE(X,Y,Z)
311 CONTINUE
DO 316 L=1,NUML
DO 316 J=1,2
DO 316 K=1,2
Z=FLOAT(6+NUML)
IF(K,EQ,2)Z=1,0
SUM=VOIC(L,J,1)
SUM=SUM+XNASAL(L,J,1)
SUM=SUM+SUST(L,J,1)
SUM=SUM+SIBIL(L,J,1)
SUM=SUM+GRAY(L,J,1)
SUM=SUM+COMP(L,J,1)
IF(K,EW,2)SUM=SUM/6,0
TOT(J,K)=SUM**K/Z +TOT(J,K)
316 CONTINUE
DO 806 IIII=1,2
TUT(3,1)=0,0
TOT(3,2)=0,0
H242H,01160000,014
WRITE(6,400)NUML
WRITE(6,401)(ISYTE(I),I=1,58)
WRITE(6,402)NUMS
WHITE(6,551)
501 FORMAT('LISTENER MEAN DRT')
DO 401 L=1,NUML
SUM=0,0
DO 502 J=1,2
SUM = SUM + VOIC(L,J,1)
SUM = SUM + XNASAL(L,J,1)
SUM = SUM + SUST(L,J,1)
SUM = SUM + SIBIL(L,J,1)
SUM = SUM + GRAY(L,J,1)
SUM = SUM + COMP(L,J,1)
502 CONTINUE
XSUM = SUM/12,0
WHITE(6,550)L,XSUM,(NAME(L,J),J=1,24)
506 FORMAT(10,F11.2,3X,24A1)
TOT(3,1) = TOT(3,1) + SUM/FLOAT(NUML)/12,0
TOT(3,2) = TOT(3,2)+(SUM/12,0)**2
401 CONTINUE
Z = FLOAT(NUML)
X=TUT(3,2)

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Y = TOT(3,1)
TOT(3,2) = SE(X,Y,Z)
DO 317 J=1,2
Z=FLOAT(NUML)
X=TOT(J,2)
Y=TOT(J,1)
TOT(J,2)=SE(X,Y,Z)
317
CONTINUE
400 FORMAT('DRT MEANS AND STANDARD ERRORS FOR I,IJ,1 LISTENERS')
401 FORMAT('SYSTEM UNDER TESTI ',1,00A1/)
402 FURMAT('NUMBER OF SPEAKERS ',1,I2/)
WRITE(6,403)
403 FURMAT('MAIN ATTRIBUTEI',12X,'PRESENT',10X,'ABSENT',
1 12X,'TOTAL')
WRITE(6,404)
404 FURMAT(20X,3(4X,'MEAN      S.E.   ') )
WRITE(6,405)((VOIC(I,J,1),I=19,20),J=1,2),(VOIC(18,I,1),I=1,2)
405 FURMAT(3X,'VOICING',9X,3(3X,F6,2,2X,F6,2))
WHITE(6,406)((VOIC(I,J,2),I=19,20),J=1,2),(VOIC(18,I,2),I=1,2)
406 FURMAT(6X,'FRICITIONAL',4X,3(3X,F6,2,2X,F6,2))
WHITE(6,407)((VOIC(I,J,3),I=19,20),J=1,2),(VOIC(18,I,3),I=1,2)
407 FURMAT(6X,'HON-FRICITIONAL',3(3X,F6,2,2X,F6,2))
WHITE(6,408)((XNASAL(I,J,1),I=19,20),J=1,2),
1 (XNASAL(18,I,1),I=1,2)
408 FURMAT(3X,'INASALITY',8X,3(3X,F6,2,2X,F6,2))
WHITE(6,409)((XNASAL(I,J,2),I=19,20),J=1,2),
1 (XNASAL(18,I,2),I=1,2)
409 FURMAT(6X,'GRAVE',9X,3(3X,F6,2,2X,F6,2))
WHITE(6,410)((XNASAL(I,J,3),I=19,20),J=1,2),
1 (XNASAL(18,I,3),I=1,2)
410 FURMAT(6X,'ACUTE',9X,3(3X,F6,2,2X,F6,2))
WHITE(6,411)((SUST(I,J,1),I=19,20),J=1,2),(SUST(18,I,1),I=1,2)
411 FURMAT(3X,'SUSTENTION',6X,3(3X,F6,2,2X,F6,2))
WHITE(6,412)((SUST(I,J,2),I=19,20),J=1,2),(SUST(18,I,2),I=1,2)
412 FURMAT(6X,'VOICED',8X,3(3X,F6,2,2X,F6,2))
WHITE(6,413)((SUST(I,J,3),I=19,20),J=1,2),(SUST(18,I,3),I=1,2)
413 FURMAT(6X,'UNVOICED',8X,3(3X,F6,2,2X,F6,2))
WHITE(6,414)((SIBIL(I,J,1),I=19,20),J=1,2),(SIBIL(18,I,1),I=1,2)
414 FURMAT(3X,'SIBILATION',6X,3(3X,F6,2,2X,F6,2))
WHITE(6,415)((SIBIL(I,J,2),I=19,20),J=1,2),(SIBIL(18,I,2),I=1,2)
WHITE(6,413)((SIBIL(I,J,3),I=19,20),J=1,2),(SIBIL(18,I,3),I=1,2)
WHITE(6,415)((GRAY(I,J,1),I=19,20),J=1,2),(GRAY(18,I,1),I=1,2)
415 FURMAT(3X,'GRAVENE88',7X,3(3X,F6,2,2X,F6,2))
WHITE(6,412)((GRAY(I,J,2),I=19,20),J=1,2),(GRAY(18,I,2),I=1,2)
WHITE(6,413)((GRAY(I,J,3),I=19,20),J=1,2),(GRAY(18,I,3),I=1,2)
WHITE(6,416)((COMP(I,J,1),I=19,20),J=1,2),(COMP(18,I,1),I=1,2)
416 FURMAT(3X,'COMPACTNE88',6X,3(3X,F6,2,2X,F6,2))
WHITE(6,412)((COMP(I,J,2),I=19,20),J=1,2),(COMP(18,I,2),I=1,2)
WHITE(6,413)((COMP(I,J,3),I=19,20),J=1,2),(COMP(18,I,3),I=1,2)
WHITE(6,417)((TOT(I,J),J=1,2),I=1,3)
417 FURMAT(3X,'TOTAL8',10X,3(3X,F6,2,2X,F6,2))
WHITE(6,498)(TOT(3,J),J=1,2)
498 FURMAT(/30X,'*****')
1 30X,'* MEAN * ',F6,2,' * '
1 13X,'TOTAL DRT SCOREI ',1,10X,' * '
1 30X,'* S.E. * ',1,F6,2,' * '
1 30X,'*****')
NUMTOT = 192*NUML*NUMB
WRITE(6,555)NUMTOT
555 FURMAT(/10X'TOTAL NUMBER OF TEST ITEMS ',I2)
CONTINUE
STOP
END

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SUBROUTINE CHECK(IOVER)

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THIS SUBROUTINE CHECKS FOR CORRECT ENTRY OF DATA

DIMENSION LINE(31)  
COMMON IRESP(2,20)  
IPASS =1  
N=1  
M=15  
1 IF(IPASS.EQ.2)N=160M=20  
R2469,0116000,014  
WHITE(5,21)  
FORMAT(18X,'11,16X,'2')  
DO 1 I=N,M  
DO 3 II = 1,31  
LINE(II) = ' '  
IF(IRESP(1,I).EQ.2)GOTO 4  
L=9  
IF(IRESP(1,I).NE.1)L=13  
DO 2 J=1,L  
LINE(J) = 'X'  
GOTO 5  
4 CONTINUE  
DO 6 J = 9,13  
LINE(J) = 'X'  
5 CONTINUE  
IF(IRESP(2,I).EQ.2)GOTO 8  
L=23  
IF(IRESP(2,I).NE.1)L=31  
DO 7 J=19,L  
LINE(J) = 'X'  
GOTO 9  
8 CONTINUE  
DO 10 J=27,31  
LINE(J) = 'X'  
9 CONTINUE  
WHITE(5,11)I,(LINE(J),J=1,31)  
FORMAT(5X,I2,5X,31A1)  
1 CONTINUE  
WHITE(5,12)  
FORMAT(/'IF OK ENTER 01')  
READ(5,13)IANS  
13 FORMAT(1I)  
IF(IANS.EQ.0)GOTO 14  
14 WRITE(5,15)  
15 FORMAT(/'ROW AND COLUMN TO CHANGE? ENTER 999 TO CHANGE ENTIRE!',  
' PAGE! /' RRC')  
READ(5,16)IROW,ICOL  
IF(IROW.EQ.99)RETURN IOVER  
IF(IROW.GT.29)GOTO 30  
IF(IROW.LT.1)GOTO 30  
IF(ICOL.GT.2)GOTO 30  
IF(ICOL.LT.1)GOTO 30  
16 FORMAT(12,1I)  
WHITE(5,17)  
17 FORMAT(/'NEW ENTRY? /' R1)  
READ(5,18)IRESP(ICOL,IROW)

IF (IRW,LE,15) GOTO 31  
GOTO 20  
14 IF (IPASS ,EU,2) RETURN  
IPASS = 2  
GOTO 20  
END

10 FEB 78

DIAGNOSTIC RHYME TEST SCORING W/CARTRIDGE INPUT

CSP-30 IMPLEMENTATION

FUR INFORMATION CONCERNING THIS PROGRAM CONTACT:

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AUTOVON 476-4433

```
COMMON ARRAY(60),ISYS(50),NAME(11,24),NPAGE(7,2,3),
1 DATA(11,7,36),MSPK(11,6)
1 DIMENSION SEND(6)
1 WRITE(5,50)
50 FORMAT(//120X,'DRT CARTRIDGE DATA CHECKOUT//'
1 '!INSERT CARTRIDGE IN UPPER DECK !//'
1 '!I/U RESET + CONTINUE!//')
1 PAUSE
1 READ(7,75)(1SYS(I),I=1,50),NUML,NUMS
1 FORMAT(50A1,2I3)
1 FORMAT(50A1/'NUMBER LISTENERS =',I3/'NUMBER SPEAKERS =',I3//)
1 0242P,0116000,014
1 DO 2 LIST = 1,NUML
1 READ(7,3)(NAME(LIST,I),I=1,24)
3 FORMAT(24A1)
3 DO 4 ISPK = 1,NUMS
3 WRITE(6,500)
500 FORMAT(' ')
3 WRITE(6,1)(ISYS(I),I=1,50),NUML,NUMS
3 READ(7,30)MSPK(LIST,ISPK)
30 FORMAT(A2)
3 READ(7,5)((NPAGE(I,J,K),I=1,7),J=1,2),K=1,3)
3 FORMAT(13)
3 WRITE(6,40)(NAME(LIST,I),I=1,24),MSPK(LIST,ISPK)
40 FORMAT(9X,28(''),10X,6(''),/
1 '!LISTENER: ',24A1,' + SPEAKER: ',1X,A2,' + '
1 '9X,28(''),10X,6(''),/
1 '!NUMBER OF INCORRECT RESPONSES!//')
1 DU 20 I=1,6
1 DU 22 K=1,3
1 DO 41 J=1,2
1 L = 6*I+J+2*K-8
1 NTOT = 16
1 IF(K,NE,1)NTOT=8
61 TOT = FLOAT(NTOT)
DATA(LIST,ISPK,L)=(2.0*FLOAT(NPAGE(I,J,K))*TOT)*100./TOT
NPAGE(I,J,K) = NTOT*NPAGE(I,J,K)
41 CONTINUE
22 CONTINUE
20 CONTINUE
1 WRITE(6,276)
1 WRITE(6,277)(NPAGE(I,J,1),J=1,2)
1 WRITE(6,278)(NPAGE(I,J,2),J=1,2)
```

```

      WRITE(6,279)(NPAGE(I,J,3),J=1,2)
      WRITE(6,280)(NPAGE(2,J,1),J=1,2)
      WRITE(6,281)(NPAGE(2,J,2),J=1,2)
      WRITE(6,282)(NPAGE(2,J,3),J=1,2)
      WRITE(6,283)(NPAGE(3,J,1),J=1,2)
      WRITE(6,284)(NPAGE(3,J,2),J=1,2)
      WRITE(6,285)(NPAGE(3,J,3),J=1,2)
      WRITE(6,286)(NPAGE(4,J,1),J=1,2)
      WRITE(6,287)(NPAGE(4,J,2),J=1,2)
      WRITE(6,288)(NPAGE(4,J,3),J=1,2)
      WRITE(6,289)(NPAGE(5,J,1),J=1,2)
      WRITE(6,290)(NPAGE(5,J,2),J=1,2)
      WRITE(6,291)(NPAGE(5,J,3),J=1,2)
      WRITE(6,292)(NPAGE(6,J,1),J=1,2)
      WRITE(6,293)(NPAGE(6,J,2),J=1,2)
      WRITE(6,294)(NPAGE(6,J,3),J=1,2)
      0242B,0116888,014
21   FORMAT(10X,I5,5X,I5)
4    CONTINUE
2    CONTINUE
     DO 280 LIST=1,NUML
1    0242B,0116888,014
      WRITE(6,500)
      WRITE(6,1)(ISYS(I),I=1,50),NUML,NUMS
      WRITE(6,201)(NAME(LIST,I),I=1,24)
201   FORMAT(13X,27('!')//FOR LISTENER! ',24A1,! +/
1    13X,27('!*')//!
1    !SPAR SCURE!/)
     DO 284 ISPKR=1,NUMS
     SUM = 0.0
     DO 282 I=1,31,6
     J=I+1
282   SUM = SUM + DATA(LIST,ISPKR,I) + DATA(LIST,ISPKR,J)
     SUM = SUM/12.0
     WRITE(6,203)ISPKR(LIST,ISPKR),SUM
203   FORMAT(1X,A2,1X,F7.2)
204   CONTINUE
      WRITE(6,403)
      WRITE(6,404)
     DO 209 I=1,6
209   SEND(I)=0.0
     DO 210 I=1,35,2
     J=I+1
     DO 211 K=1,NUMS
211   ARRAY(K)=DATA(LIST,K,I)
     CALL STATS(NUMS,X,S)
     SEND(1)=X
     SEND(2)=S
     DO 212 K=1,NUMS
212   ARRAY(K)=DATA(LIST,K,J)
     CALL STATS(NUMS,X,S)
     SEND(3)=X
     SEND(4)=S
     DO 213 K=1,NUMS
213   ARRAY(K)=(ARRAY(K)+DATA(LIST,K,I))/2.0
     CALL STATS(NUMS,X,S)
     SEND(5)=X
     SEND(6)=S
     CALL OUT(I,SEND)
210   CONTINUE
     DO 215 K=1,NUMS
     SUM = 0.0
     DO 214 I=1,31,6
214   SUM = SUM + DATA(LIST,K,I)

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```

215      ARRAY(K) = SUM/6.0
      CALL STATS(NUMS,X,S)
      SEND(1)=X
      SEND(2)=S
      DU 216 K=1,NUMS
      SUM = 0.0
      DU 217 I=2,32,6
      SUM = SUM + DATA(LIST,K,I)
      ARRAY(K) = SUM/6.0
      CALL STATS(NUMS,X,S)
      SEND(3) = X
      SEND(4) = S
      DU 218 K=1,NUMS
      SUM = 0.0
      DO 218 I=1,31,6
      J = I+1
      SUM = SUM + DATA(LIST,K,I) + DATA(LIST,K,J)
      ARRAY(K) = SUM/12.0
      CALL STATS(NUMS,X,S)
      SEND(5) = X
      SEND(6) = S
      CALL OUT(36,SEND)
      WRITE(6,490)X,S
200      CONTINUE
      DU 300 ISPKR = 1,NUMS
      A242B,A116000,014
      WRITE(6,500)
      WRITE(6,1)(ISYS(I),I=1,50),NUML,NUMS
      WRITE(6,301)MSPK(1,ISPKR)
      1 FORMAT(12X,1*****1/'FOR SPEAKER1 ',A2,1*'1
      12X,1*****1/'LISTENER1',16X,'SCORE1')
      DU 304 LIST = 1,NUML
      SUM = 0.0
      DO 302 I=1,31,6
      J=I+1
      SUM = SUM+DATA(LIST,ISPKR,I)+DATA(LIST,ISPKR,J)
      SUM = SUM/12.0
      WRITE(6,303)(NAME(LIST,L),L=1,24),SUM
      FORMAT(24A1,F7.2)
304      CONTINUE
      WRITE(6,403)
      WRITE(6,404)
      DU 310 I=1,35,2
      J=I+1
      DU 311 K=1,NUML
      AHRAY(K)=DATA(K,ISPKR,I)
      CALL STATS(NUML,X,S)
      SEND(1)=X
      SEND(2)=S
      DO 312 K=1,NUML
      AHRAY(K)=DATA(K,ISPKR,J)
      CALL STATS(NUML,X,S)
      SEND(3)=X
      SEND(4)=S
      DO 313 K=1,NUML
      AHRAY(K) = (AHRAY(K)+DATA(K,ISPKR,I))/2.0
      CALL STATS(NUML,X,S)
      SEND(5)=X
      SEND(6)=S
      CALL OUT(1,SEND)
      CONTINUE
      DU 313 K=1,NUML
      SUM = 0.0
      DO 314 I=1,31,6

```

```

314  SUM = SUM + DATA(K,ISPKR,I)
315  ARRAY(K) = SUM/6,0
      CALL STATS(NUML,X,S)
      SEND(1)=X
      SEND(2)=S
      DD 316 K=1,NUML
      SUM = 0,0
      DU 317 I=2,32,6
      SUM = SUM+DATA(K,ISPKR,I)
      ARRAY(K)=SUM/6,0
      CALL STATS(NUML,X,S)
      SEND(3)=X
      SEND(4)=S
      DU 318 K=1,NUML
      SUM = 0,0
      DU 318 I=1,31,6
      J=I+1
      SUM = SUM+DATA(K,ISPKR,I)+DATA(K,ISPKR,J)
      ARRAY(K)=SUM/12,0
      CALL STATS(NUML,X,S)
      SEND(5)=X
      SEND(6)=S
      CALL UUT(36,SEND)
      WRITE(6,490) X,S
      CONTINUE
      !          B2428,W1160000,014
      WRITE(6,500)
      WRITE(6,1)(ISYS(I),I=1,50),NUML,NUMS
      WRITE(6,320)
      FORMAT('CUMBINED RESULTS = STANDARD ERRORS ACROSS ',/
      1 'SPEAKERS AND LISTENERS *****'//)
      WRITE(6,403)
      WRITE(6,404)
      NUMT = NUML*NUMS
      DU 321 L=1,35,2
      J=I+1
      DU 322 K=1,NUML
      DU 322 L=1,NUMS
      M=NUMS*(K-1)+L
      322  ARRAY(M)=DATA(K,L,I)
      CALL STATS(NUMT,X,S)
      SEND(1)=X
      SEND(2)=S
      DU 323 K=1,NUML
      DU 323 L=1,NUMS
      M=NUMS*(K-1)+L
      323  ARRAY(M)=DATA(K,L,J)
      CALL STATS(NUMT,X,S)
      SEND(3)=X
      SEND(4)=S
      DU 324 K=1,NUML
      DU 324 L=1,NUMS
      M=NUMS*(K-1)+L
      SUM = DATA(K,L,I)+DATA(K,L,J)
      324  ARRAY(M)=SUM/2,0
      CALL STATS(NUMT,X,S)
      SEND(5)=X
      SEND(6)=S
      CALL UUT(1,SEND)
      CONTINUE
      DO 325 K=1,NUML
      DO 325 L=1,NUMS
      M=NUMS*(K-1)+L

```

```

      SUM = 0.0
326  DO 326 I=1,31,6
      SUM = SUM+DATA(K,L,I)
      ARRAY(M)=SUM/6.0
      CALL STATS(NUML,X,S)
      SEND(1)=X
      SEND(2)=S
      DO 327 K=1,NUML
      DO 327 L=1,NUMS
      M=NUMS*(K-1)+L
      SUM=0.0
      DO 328 I=2,32,6
      SUM = SUM + DATA(K,L,I)
      ARRAY(M)=SUM/6.0
      CALL STATS(NUML,X,S)
      SEND(3)=X
      SEND(4)=S
      DO 330 K=1,NUML
      DO 330 L=1,NUMS
      M=NUMS*(K-1)+L
      SUM=0.0
      DO 331 I=1,31,6
      J=I+1
331  SUM = SUM+DATA(K,L,I)+DATA(K,L,J)
      ARRAY(M)=SUM/12.0
      CALL STATS(NUML,X,S)
      SEND(5)=X
      SEND(6)=S
      CALL OUT(36,SEND)
      WRITE(6,490) X,S
      82420,0110000,014
      WRITE(6,500)
      WRITE(6,1)(ISYB(I),I=1,50),NUML,NUMS
      DO 70 I=1,NUML
      DO 70 J=1,NUMS
      WRITE(6,71)(DATA(I,J,K),K=1,36)
71    FORMAT(/(6(2X,F10.2)))
70    CONTINUE
      STOP
276  FORMAT(10X,'MAIN ATTRIBUTE!!',18X,'PRESENT!',7X,'ABSENT!//')
277  FORMAT(15X,'VOICING!',23X,I2,11X,I2)
278  FORMAT(20X,'FRICTIONAL!',16X,I2,11X,I2)
279  FORMAT(20X,'NON-FRICTIONAL!',12X,I2,11X,I2/)
280  FORMAT(15X,'INASALITY!',22X,I2,11X,I2)
281  FORMAT(20X,'GRAVE!',21X,I2,11X,I2)
282  FORMAT(20X,'ACUTE!',21X,I2,11X,I2/)
283  FORMAT(15X,'SUSTENTION!',20X,I2,11X,I2)
284  FORMAT(20X,'VOICED!',20X,I2,11X,I2)
285  FORMAT(20X,'UNVOICED!',18X,I2,11X,I2/)
286  FORMAT(15X,'SIBILATION!',20X,I2,11X,I2)
287  FORMAT(15X,'GHAVENESS!',21X,I2,11X,I2)
288  FORMAT(15X,'COMPACTNESS!',19X,I2,11X,I2)
480  FORMAT('DRT MEANS AND STANDARD ERRORS FOR!,I3,' LISTENERS!/)
481  FORMAT('SYSTEM UNDER TEST! ',58A1/)
482  FORMAT('NUMBER OF SPEAKERS =!',I2/)
483  FORMAT(//'MAIN ATTRIBUTE!!',12X,'PRESENT!',10X,'ABSENT!',
1 12X,'TOTAL!/')
484  FORMAT(20X,3(4X,'MEAN     8,E, 1')/)
498  FORMAT(/30X,'*****'*1/
1 30X,'* MEAN = !,F6,2,! *!/
1 13X,'TOTAL DRT SCORE! *!,15X,!*/!
1 30X,! 8,E, 8 !,F6,2,! *!/
1 30X,'*****'*1)
END

```

C  
C  
C  
C  
C  
C  
SUBROUTINE STATS(N,XMEAN,STDERR)

C  
COMMON ARRAY(60)  
X=0.0  
XN = FLUAT(N)  
DO 1 I=1,N  
X = X + ARRAY(I)  
1 CONTINUE  
XMEAN = X/XN  
STDERR = 0.0  
DO 2 I=1,N  
2 STDERR = STDERR + (ARRAY(I)-XMEAN)\*(ARRAY(I)-XMEAN)  
STDERR = SQRT(STDERR/XN/XN)  
RETURN  
END

C  
C  
C  
C  
C  
C  
SUBROUTINE UUT(N,X)  
DIMENSION X(6)  
IF (N,EQ,36)GOTU 19  
K=(N+1)/2  
IF (K,EQ,11)K=8  
IF (K,EQ,14)K=8  
IF (K,EQ,17)K=8  
IF (K,EQ,12)K=9  
IF (K,EQ,15)K=9  
IF (K,EQ,18)K=9  
IF (K,EQ,13)K=11  
IF (K,EQ,16)K=12  
GOTO(1,2,3,4,5,6,7,8,9,10,13,16),K  
1 WRITE(6,405)(X(I),I=1,6)  
RETURN  
2 WRITE(6,406)(X(I),I=1,6)  
RETURN  
3 WRITE(6,407)(X(I),I=1,6)  
RETURN  
4 WRITE(6,408)(X(I),I=1,6)  
RETURN  
5 WRITE(6,409)(X(I),I=1,6)  
RETURN  
6 WRITE(6,410)(X(I),I=1,6)  
RETURN  
7 WRITE(6,411)(X(I),I=1,6)  
RETURN  
8 WRITE(6,412)(X(I),I=1,6)  
RETURN  
9 WRITE(6,413)(X(I),I=1,6)  
RETURN  
10 WRITE(6,414)(X(I),I=1,6)  
RETURN  
13 WRITE(6,415)(X(I),I=1,6)

```

16    RETURN
17    WRITE(6,418)(X(I),I=1,6)
18    RETURN
19    WRITE(6,417)(X(I),I=1,6)
20    RETURN
205   FORMAT(3X,'VOICING',9X,3(3X,F6.2,2X,F6.2))
210   FORMAT(6X,'FRICTIONAL',4X,3(3X,F6.2,2X,F6.2))
215   FORMAT(6X,'NON-FRICTIONAL',3(3X,F6.2,2X,F6.2)/)
220   FORMAT(3X,'NASALITY',9X,3(3X,F6.2,2X,F6.2))
225   FORMAT(6X,'GRAVE',9X,3(3X,F6.2,2X,F6.2))
230   FORMAT(6X,'ACUTE',9X,3(3X,F6.2,2X,F6.2)/)
235   FORMAT(3X,'SUSTENTION',6X,3(3F6.2,2X,F6.2))
240   FORMAT(6X,'VOICED',8X,3(3X,F6.2,2X,F6.2))
245   FORMAT(6X,'UNVOICED',6X,3(3X,F6.2,2X,F6.2)/)
250   FORMAT(3X,'SIBILATION',6X,3(3X,F6.2,2X,F6.2))
255   FORMAT(3X,'GRAVENESS',7X,3(3X,F6.2,2X,F6.2))
260   FORMAT(3X,'COMPACTNESS',5X,3(3X,F6.2,2X,F6.2))
265   FORMAT(3X,'TOTALS',10X,3(3X,F6.2,2X,F6.2))
270   END

```

## DIAGNOSTIC RHYME TEST

### LISTENER SUMMARIES

#### SAMPLE TEST RUN

LISTENER 1 SPEAKER KEY DOE, JOHN  
 BV 1W2B  
 JE 113A

#### NUMBER OF CORRECT RESPONSES

MAIN ATTRIBUTE	PRESENT	ABSENT
VOICING	32,00	29,00
FRICTIONAL	16,00	13,00
NON-FRICTIONAL	16,00	16,00
NASALITY	31,00	30,00
GRAVE	16,00	15,00
ACUTE	15,00	15,00
SUSTENTION	24,00	25,00
VOICED	13,00	11,00
UNVOICED	11,00	14,00
SIBILATION	31,00	31,00
VOICED	15,00	16,00
UNVOICED	16,00	15,00
GRAVENESS	25,00	29,00
VOICED	15,00	16,00
UNVOICED	09,99	13,00
COMPACTNESS	32,00	29,00
VOICED	16,00	14,00
UNVOICED	16,00	15,00

SAMPLE TEST RUN

LISTENER 2 SPEAKER KEY JONES, ROBERT  
 BV 182B  
 JE 113A

NUMBER OF CORRECT RESPONSES

MAIN ATTRIBUTE	PRES	ABSENT
VOICING	32,00	30,00
FRICTIONAL	16,00	16,00
NON-FRICTIONAL	16,00	14,00
NASALITY	32,00	31,00
GRAVE	16,00	15,00
ACUTE	16,00	16,00
SUSTENTION	28,00	26,00
VOICED	11,00	12,00
UNVOICED	14,00	14,00
SIBILATION	28,00	32,00
VOICED	14,00	16,00
UNVOICED	14,00	16,00
CHAVENESS	31,00	29,00
VOICED	16,00	18,00
UNVOICED	15,00	13,00
COMPACTNESS	32,00	32,00
VOICED	16,00	16,00
UNVOICED	16,00	16,00

SAMPLE TEST RUN  
 LISTENER 1 PERCENT CORRECT WITH GUESSING TRANSFORMATION  
 DUE, JOHN

MAIN ATTRIBUTE	PRES	ABSENT
VUICING	899,99	81,25
FRICTIONAL	899,99	82,50
NUN-FRICTIONAL	899,99	899,99
NASALITY	93,75	87,50
GRAVE	899,99	87,50
ACUTE	87,50	87,50
SUSTENTION	50,00	56,25
VOICED	62,50	37,50
UNVOICED	37,50	75,00
SIBILATION	93,75	93,75
VOICED	87,50	899,99
UNVOICED	899,99	87,50
GRAVENESS	50,25	81,25
VOICED	87,50	899,99
UNVOICED	25,00	62,50
COMPACTNESS	899,99	81,25
VOICED	899,99	75,00
UNVOICED	899,99	87,50

SAMPLE TEST RUN  
 LISTENER 2 PERCENT CORRECT WITH GUESSING TRANSFORMATION  
 JUNES, ROBERT

MAIN ATTRIBUTE	PRESENT	ABSENT
VOICING	899,99	97,50
FRICITIONAL	899,99	899,99
NON-FRICITIONAL	899,99	75,00
NASALITY	899,99	93,75
GRAVE	899,99	87,50
ACUTE	899,99	899,99
SUBTENSIION	86,25	82,50
VOICED	37,50	50,00
UNVOICED	75,00	75,00
SIBILATION	75,00	899,99
VOICED	75,00	899,99
UNVOICED	75,00	899,99
GRAVENESS	93,75	81,25
VOICED	899,99	899,99
UNVOICED	87,50	82,50
COMPACTNESS	899,99	899,99
VOICED	899,99	899,99
UNVOICED	899,99	899,99

## DRT MEANS AND STANDARD ERRORS FOR 2 LISTENERS

SYSTEM UNDER TEST: SAMPLE TEST RUN

NUMBER OF SPEAKERS = 2

## LISTENER MEAN DRT

1	81.25	JOE, JOHN
2	87.50	JONES, ROBERT

MAIN ATTRIBUTE	PRESENT		ABSENT		TOTAL	
	MEAN	S.E.	MEAN	S.E.	MEAN	S.E.
VOCALICING	899.99	0.00	84.37	2.21	92.19	1.16
FRICITIONAL	899.99	0.00	81.25	13.26	90.62	6.63
NON-FRICITIONAL	899.99	0.00	87.50	8.84	93.75	4.42
NASALITY	96.87	2.21	98.62	2.21	93.75	2.21
GRAVE	899.99	0.00	87.50	0.00	93.75	0.00
ACUTE	93.75	4.42	93.75	4.42	93.75	4.42
SUSTENTION	93.12	2.21	59.37	2.21	56.25	2.21
VOICED	50.00	8.84	43.75	4.42	46.87	2.21
UNVOICED	56.25	13.26	75.00	0.00	65.62	6.63
SIBILATION	84.37	6.63	96.87	2.21	90.62	2.21
VOICED	81.25	4.42	899.99	0.00	90.62	2.21
UNVOICED	87.50	8.84	93.75	4.42	90.62	2.21
GRAVENESS	75.00	13.26	81.25	0.00	78.12	6.63
VOICED	93.75	4.42	699.99	0.00	96.87	2.21
UNVOICED	56.25	22.10	62.50	0.00	59.37	11.05
COMPACTNESS	899.99	0.00	98.62	6.63	98.31	3.31
VOICED	699.99	0.00	87.50	8.84	93.75	4.42
UNVOICED	899.99	0.00	93.75	4.42	96.87	2.21
TOTALS	84.90	1.04	83.00	2.58	84.37	2.21

\*\*\*\*\*

\* MEAN = 84.37 \*

TOTAL DRT SCORE:

\*\*\*\*\*

\* S.E. = 2.21 \*

\*\*\*\*\*

TOTAL NUMBER OF TEST ITEMS = 700

## DRT MEANS AND STANDARD ERRORS FOR 2 LISTENERS

SYSTEM UNDER TEST: SAMPLE TEST RUN

NUMBER OF SPEAKERS = 2

## LISTENER MEAN DRT

1	81.25	DOE, JOHN
2	87.50	JONES, ROBERT

MAIN ATTRIBUTE	PRESENT		ABSENT		TOTAL	
	MEAN	S.E.	MEAN	S.E.	MEAN	S.E.
VUICING	899.99	0.00	84.37	2.21	92.10	1.10
FRICTIONAL	899.99	0.00	81.25	13.26	90.62	6.63
NUN-FRICTIONAL	899.99	0.00	87.50	8.84	93.75	4.42
NASALITY	96.87	2.21	98.62	2.21	93.75	2.21
GRAVE	899.99	0.00	87.50	0.00	93.75	0.00
ACUTE	93.75	4.42	93.75	4.42	93.75	4.42
SUSTENTION	53.12	2.21	59.37	2.21	56.25	2.21
VUICED	50.00	8.84	43.75	4.42	46.87	2.21
UNVUICED	56.25	13.26	75.00	0.00	65.62	6.63
SIBILATION	84.37	6.63	96.87	2.21	90.62	2.21
VUICED	81.25	4.42	899.99	0.00	90.62	2.21
UNVUICED	87.50	8.84	93.75	4.42	90.62	2.21
GRAVENESS	75.00	13.26	81.25	0.00	78.12	6.63
VUICED	93.75	4.42	899.99	0.00	96.87	2.21
UNVUICED	56.25	22.10	62.50	0.00	59.37	11.05
LUMPACTNESS	899.99	0.00	98.62	6.63	95.31	3.31
VUICED	899.99	0.00	87.50	8.84	93.75	4.42
UNVUICED	899.99	0.00	93.75	4.42	96.87	2.21
TOTALS	84.90	0.00	83.85	0.00	84.37	2.21

\*\*\*\*\*

\* MEAN = 84.37 \*

TOTAL DRT SCORES \*

\* S.E. = 2.21 \*

\*\*\*\*\*

TOTAL NUMBER OF TEST ITEMS = 768

SAMPLE TEST RUN

NUMBER LISTENERS = 2  
NUMBER SPEAKERS = 2

\*\*\*\*\*  
LISTENER DUE, JOHN \* SPEAKERI \* BV \*  
\*\*\*\*\*

NUMBER OF INCORRECT RESPONSES:

MAIN ATTRIBUTE:	PRES	AUSENT
VOICING	0	2
FRICITIONAL	0	2
NON-FRICITIONAL	0	0
NASALITY	1	2
GRAVE	0	1
ACUTE	1	1
BESTENTION	5	3
VOICED	2	1
UNVOICED	3	2
SIBILATION	1	1
VOICED	1	0
UNVOICED	0	1
GRAVENESS	4	2
VOICED	1	0
UNVOICED	3	2
COMPACTNESS	0	3
VOICED	0	2
UNVOICED	0	1

SAMPLE TEST RUN

NUMBER LISTENERS = 2  
NUMBER SPEAKERS = 2

\*\*\*\*\*  
LISTENER: DUE, JOHN \* SPEAKER: JE \*  
\*\*\*\*\*

NUMBER OF INCORRECT RESPONSES:

MAIN ATTRIBUTE	PRESENT	ABSENT
VOICING	0	1
FRICITIONAL	0	1
NON-FRICITIONAL	0	0
NASALITY	0	0
GRAVE	0	0
ACUTE	0	0
SUSTENTION	3	4
VOICED	1	4
UNVOICED	2	0
SIBILATION	0	0
VOICED	0	0
UNVOICED	0	0
GRAVENESS	3	1
VOICED	0	0
UNVOICED	3	1
COMPACTNESS	0	0
VOICED	0	0
UNVOICED	0	0

SAMPLE TEST RUN

NUMBER LISTENERS = 2  
NUMBER SPEAKERS = 2

\*\*\*\*\*  
LISTENER: JONES, ROBERT \* SPEAKER: BV \*  
\*\*\*\*\*

NUMBER OF INCORRECT RESPONSES:

MAIN ATTRIBUTE:	PRESENT	ABSENT
VOICING	0	0
FRictional	0	0
NON-FRictional	0	0
NASALITY	0	0
GRAVE	0	0
ACUTE	0	0
SUSTENTION	3	4
VOICEd	3	2
UNVOICEd	0	2
SIBILATION	2	0
VOICEd	2	0
UNVOICEd	0	0
GRAVENESS	0	2
VOICEd	0	0
UNVOICEd	0	2
COMPACTNESS	0	0
VOICEd	0	0
UNVOICEd	0	0

SAMPLE TEST RUN

NUMBER LISTENERS = 2  
NUMBER SPEAKERS = 2

\*\*\*\*\*  
LISTENER: JONES, ROBERT \* SPEAKER: JE \*  
\*\*\*\*\*

NUMBER OF INCORRECT RESPONSES:

MAIN ATTRIBUTE	PRESENT	ABSENT
VOICING	0	2
FRICITIONAL	0	0
NON-FRICITIONAL	0	2
NASALITY	0	1
GRAVE	0	1
ACUTE	0	0
SUSTENTION	4	2
VOICED	2	2
UNVOICED	2	0
SIBILATION	2	0
VOICED	0	0
UNVOICED	2	0
GRAVENESS	1	1
VOICED	0	0
UNVOICED	1	1
COMPACTNESS	0	0
VOICED	0	0
UNVOICED	0	0

## SAMPLE TEST RUN

NUMBER LISTENERS = 2  
NUMBER SPEAKERS = 2

\*\*\*\*\*  
FOR LISTENER: DOE, JOHN  
\*\*\*\*\*

## SPKR SCORE

6v 75.00  
JE 87.50

MAIN ATTRIBUTE	PRESENT		ABSENT		TOTAL	
	MEAN	S.E.	MEAN	S.E.	MEAN	S.E.
VOICING	899.99	0.00	81.25	4.42	98.62	2.21
FRICTIONAL	899.99	0.00	62.50	0.84	81.25	4.42
NON-FRICTIONAL	899.99	0.00	899.99	0.00	899.99	0.00
NASALITY	93.75	4.42	87.50	0.84	90.62	6.63
GHAVE	899.99	0.00	87.50	0.84	93.75	4.42
ACUTE	87.50	0.84	87.50	0.84	87.50	0.84
SUSTENATION	58.00	0.84	56.25	4.42	53.12	2.21
VOICED	62.50	0.84	37.50	26.52	58.00	8.84
UNVOICED	37.50	0.84	75.00	17.68	58.25	13.26
SIBILATION	93.75	4.42	93.75	4.42	93.75	4.42
VOICED	87.50	0.84	899.99	0.00	93.75	4.42
UNVOICED	899.99	0.00	87.50	0.84	93.75	4.42
GRAVENESS	36.25	4.42	81.25	4.42	68.75	4.42
VOICED	87.50	0.84	899.99	0.00	93.75	4.42
UNVOICED	25.00	0.84	62.50	0.84	43.75	4.42
COMPACTNESS	899.99	0.00	81.25	13.26	98.62	6.63
VOICED	899.99	0.00	75.00	17.68	87.50	8.84
UNVOICED	899.99	0.00	87.50	0.84	93.75	4.42
TOTALS	82.29	3.68	80.21	5.16	81.25	4.42

\*\*\*\*\*  
\* MEAN = 81.25 \*  
TOTAL DRT SCORE! \*  
\* S.E. = 4.42 \*  
\*\*\*\*\*

## SAMPLE TEST RUN

NUMBER LISTENERS = 2  
 NUMBER SPEAKERS = 2

\*\*\*\*\*  
 FOR LISTENER: JONES, ROBERT  
 \*\*\*\*\*

SPKR SCORE

BV 88.54  
 JE 88.46

MAIN ATTRIBUTE	PRESENT		ABSENT		TOTAL	
	MEAN	S.E.	MEAN	S.E.	MEAN	S.E.
VOICING	899.99	0.00	87.50	0.04	93.75	4.42
FRICITIONAL	899.99	0.00	899.99	0.00	899.99	0.00
NON-FRICITIONAL	899.99	0.00	75.00	17.68	87.50	8.84
NASALITY	899.99	0.00	93.75	4.42	96.87	2.21
GRAVE	899.99	0.00	87.50	0.84	93.75	4.42
ACUTE	899.99	0.00	899.99	0.00	899.99	0.00
SUSTENTION	56.25	4.42	62.50	0.04	59.37	2.21
VOICED	37.50	0.84	50.00	0.00	43.75	4.42
UNVOICED	75.00	17.68	75.00	17.68	75.00	0.00
SIBILATION	75.00	0.00	899.99	0.00	87.50	0.00
VOICED	75.00	17.68	899.99	0.00	87.50	8.84
UNVOICED	75.00	17.68	899.99	0.00	87.50	8.84
GRAVENESS	93.75	4.42	81.25	4.42	87.50	0.00
VOICED	899.99	0.00	899.99	0.00	899.99	0.00
UNVOICED	87.50	0.04	62.50	0.04	75.00	0.00
COMPACTNESS	899.99	0.00	899.99	0.00	899.99	0.00
VOICED	899.99	0.00	899.99	0.00	899.99	0.00
UNVOICED	899.99	0.00	899.99	0.00	899.99	0.00
TOTALS	87.50	1.47	87.50	0.00	87.50	0.74

\*\*\*\*\*  
 \* MEAN = 87.50 \*  
 TOTAL DRI SCORE:  
 \* 87.50 \* 0.74 \*  
 \*\*\*\*\*

## SAMPLE TEST RUN

NUMBER LISTENERS = 2  
NUMBER SPEAKERS = 2

\*\*\*\*\*  
FOR SPEAKER 1 BY \*  
\*\*\*\*\*

LISTENER	SCORE
DOE, JOHN	75.88
JONES, ROBERT	88.54

MAIN ATTRIBUTE	PRESENT		ABSENT		TOTAL	
	MEAN	S.E.	MEAN	S.E.	MEAN	S.E.
VOICING	899.99	0.00	87.50	8.84	93.75	4.42
FRICITIONAL	899.99	0.00	75.00	17.68	87.50	8.84
NON-FRICITIONAL	899.99	0.00	899.99	0.00	899.99	0.00
NASALITY	93.75	4.42	87.50	8.84	90.62	6.63
GRAVE	899.99	0.00	87.50	8.84	93.75	4.42
ACUTE	87.50	8.84	87.50	8.84	87.50	8.84
SUSTENTION	50.00	8.84	56.25	4.42	53.12	2.21
VOICED	37.50	8.84	62.50	8.84	50.00	8.84
UNVOICED	62.50	26.52	50.00	0.00	56.25	13.26
SIBILATION	81.25	4.42	93.75	4.42	87.50	0.00
VOICED	62.50	8.84	899.99	0.00	81.25	4.42
UNVOICED	899.99	0.00	87.50	8.84	93.75	4.42
GRAVENESS	75.00	17.68	75.00	0.00	75.00	8.84
VOICED	87.50	8.84	899.99	0.00	93.75	4.42
UNVOICED	62.50	26.52	50.00	0.00	56.25	13.26
COMPACTNESS	899.99	0.00	81.25	13.26	90.62	6.63
VOICED	899.99	0.00	75.00	17.68	87.50	8.84
UNVOICED	899.99	0.00	87.50	8.84	93.75	4.42
TOTALS	83.33	4.42	88.21	5.16	81.77	4.79

\*\*\*\*\*  
• MEAN = 81.77 •  
TOTAL DRT SCORE = •  
• S.E. = 4.79 •  
\*\*\*\*\*

## SAMPLE TEST RUN

NUMBER LISTENERS = 2  
 NUMBER SPEAKERS = 2

\*\*\*\*\*  
 FOR SPEAKER 1 JE \*  
 \*\*\*\*\*

LISTENER	SCORE
DOE, JOHN	87.50
JONES, ROBERT	86.46

MAIN ATTRIBUTE	PRESENT		ABSENT		TOTAL	
	MEAN	S.E.	MEAN	S.E.	MEAN	S.E.
VOICING	899.99	0.00	81.25	4.42	98.62	2.21
FRICITIONAL	899.99	0.00	87.50	0.84	93.75	4.42
NON-FRICITIONAL	899.99	0.00	75.00	17.68	87.50	0.84
NASALITY	899.99	0.00	93.75	4.42	96.87	2.21
GRAVE	899.99	0.00	87.50	0.84	93.75	4.42
ACUTE	899.99	0.00	899.99	0.00	899.99	0.00
SUSTENTION	56.25	4.42	62.50	0.84	89.37	2.21
VOICED	62.50	0.84	25.00	17.68	43.75	4.42
UNVOICED	50.00	0.00	899.99	0.00	75.00	0.00
SIBILATION	87.50	0.84	899.99	0.00	93.75	4.42
VOICED	899.99	0.00	899.99	0.00	899.99	0.00
UNVOICED	75.00	17.68	899.99	0.00	87.50	0.84
GRAVENESS	75.00	0.84	87.50	0.00	81.25	4.42
VOICED	899.99	0.00	899.99	0.00	899.99	0.00
UNVOICED	50.00	17.68	75.00	0.00	62.50	0.84
COMPACTNESS	899.99	0.00	899.99	0.00	899.99	0.00
VOICED	899.99	0.00	899.99	0.00	899.99	0.00
UNVOICED	899.99	0.00	899.99	0.00	899.99	0.00
TOTALS	86.46	0.74	87.50	0.00	96.35	0.37

\*\*\*\*\*  
 \* MEAN = 86.98 \*  
 \* S.E. = 0.37 \*  
 \*\*\*\*\*

SAMPLE TEST RUN

NUMBER LISTENERS • 2  
NUMBER SPEAKERS • 2

COMBINED RESULTS • STANDARD ERRORS ACROSS SPEAKERS AND LISTENERS \*\*\*\*\*

MAIN ATTRIBUTE	PRESENT		ABSENT		TOTAL	
	MEAN	S.E.	MEAN	S.E.	MEAN	S.E.
VOICING	999,99	0,00	84,37	3,18	92,19	2,59
FRICTIONAL	999,99	0,00	81,25	10,36	98,62	5,18
NON-FRICTIONAL	999,99	0,00	87,50	10,83	93,75	5,41
NASALITY	98,87	2,71	98,62	5,18	93,75	3,23
GRAVE	999,99	0,00	87,50	6,25	93,75	3,12
ACUTE	93,75	5,41	93,75	5,41	93,75	5,41
SUSTENTION	53,12	5,18	59,37	5,18	56,25	2,21
VOICED	58,00	8,84	43,75	13,62	46,87	5,18
UNVOICED	56,25	13,62	75,00	12,50	65,62	8,12
SIBILATION	84,37	5,18	98,62	2,71	98,62	2,71
VOICED	81,25	10,36	999,99	0,00	98,62	5,18
UNVOICED	87,50	10,83	93,75	5,41	98,62	5,18
GRAVENESS	75,00	9,00	81,25	3,12	78,12	5,18
VOICED	93,75	5,41	999,99	0,00	98,62	2,71
UNVOICED	56,25	16,24	62,50	6,25	59,37	8,12
COMPACTNESS	999,99	0,00	98,62	8,12	98,31	4,00
VOICED	999,99	0,00	87,50	10,83	93,75	5,41
UNVOICED	999,99	0,00	93,75	5,41	96,87	2,71
TOTALS	84,98	2,37	83,85	3,18	84,37	2,73
*****						
* MEAN * 84,37 *						
TOTAL DRT SCORE!						
* S.E. * 2,73 *						
*****						

## **Appendix C**

**Diagnostic Rhyme Test  
Scoring Software  
and  
Sample Printout  
PDP-11 Implementation**

\*\* R8X=11M V03 \*\* 21-MAR-78 13147159 OF01(200,200)XXX,FTN/J171  
\*\* R8X=11M V03 \*\* 21-MAR-78 13147159 OF01(200,200)XXX,FTN/J171  
\*\* R8X=11M V03 \*\* 21-MAR-78 13147159 OF01(200,200)XXX,FTN/J171

X X X X X X X X  
X X X X X X X X  
X X X X X X X X  
X X X X X X X X  
X X X X X X X X  
X X X X X X X X  
.. ..

FFFFF	T	TTTTT	N	N	11	1	7777	1
F	T	N	N	N	11	11	7	11
F	T	NN	N	N	1	1	7	1
FFFFF	T	N	N	N	11	1	7	1
F	T	N	NN	N	11	1	7	1
F	T	T	N	N	1	1	7	1
F	T	N	N	N	1	111	7	111

\*\* R8X=11M V03 \*\* 21-MAR-78 13147159 OF01(200,200)XXX,FTN/J171  
\*\* R8X=11M V03 \*\* 21-MAR-78 13147159 OF01(200,200)XXX,FTN/J171  
\*\* R8X=11M V03 \*\* 21-MAR-78 13147159 OF01(200,200)XXX,FTN/J171

```

C
      DIMENSION IBITS(16),IPACK(4)
      DIMENSION ISYS(4),IWDLST(4),ISPK(2),ILISTN(4),
X)ICOL1(29),ICOL2(29)
      DIMENSION IEQUIV(74)
      DIMENSION IALPH(26)
      DIMENSION NLIO(23),IERR(23),KEYN(12),KEYL(12),KSPK1(12)
      DIMENSION KSPK2(12),NAME(4),LSVB(2),IHEAD(34)
      EQUIVALENCE (IRECNO,IEQUIV(1)),(IPGNO,IEQUIV(2)),
X)(ISYS(1),IEQUIV(3)),(IWDLST(1),IEQUIV(7)),(ISPK(1),IEQUIV(11)),
X)(ILISTN(1),IEQUIV(13)),(ICOL1(1),IEQUIV(17)),(ICOL2(1),IEQUIV(46))
      COMMON/PAGE/IPAGE(46,54)
      COMMON/ERRORS/IAWANT(54)
      DATA NMAX/74/
      DATA IBITS/"1,""2,""4,""10,""20,""40,""100,""200,""400,""1000,
X*"2000,""4000,""10000,""20000,""40000,""100000/
      DATA NAME(1),NAME(2),NAME(3),NAME(4)/2HZ.,R,R,R/
      DATA NAMEC/2HC./
      DATA K114,K119,MASK,MASK1,IBLNK
X/"114,""119,""377,""77,2H /
      DATA IGNORE,ISTART,ISTOP,IRDROP,IEENDL
X/"1RRRRR,""1RRRR1,""1RRRR2,""1RRRR3,""1RRRR4/
      DATA IALPH(1),IALPH(2),IALPH(3),IALPH(4),IALPH(5),
X)IALPH(6),IALPH(7),IALPH(8),IALPH(9),IALPH(10),
X)IALPH(11),IALPH(12),IALPH(13),IALPH(14),IALPH(15),IALPH(16),
X)IALPH(17),IALPH(18),IALPH(19),IALPH(20),IALPH(21),IALPH(22),
X)IALPH(23),IALPH(24),IALPH(25),IALPH(26)
X/1A,1B,1C,1D,1E,1F,1G,1H,1I,1J,1K,1L,1M,1N,
X)1H,1B,1C,1D,1E,1F,1G,1H,1I,1J,1K,1L,1M,1N,
X)1H,1B,1C,1D,1E,1F,1G,1H,1I,1J,1K,1L,1M,1N/
      DATA NLIO
X/22,A15A,9339,9923,1277,4996,6854,8867,3345,5154,1529,7121,5128,
X8986,739A,2258,5406,9463,9557,8178,5349,9849,6864/

```

```

C
      DD 5A KK=1,3A
      IHEAD(KK)=IBLNK
  58      IERR(KK)=0
      DU 49 KB1,B4
  49      IAWANT(K)=0
      RDRSP=1.
      RRSPP=0.
      IRECN=0
      IPGN=0
      IPTTF=1
      CALL ASSIGN(3,'DFA1')
      CALL ASSIGN(4,'LPM1')
      CALL ASSIGN(5,'TII1')
      CALL ASSIGN(6,'TII1')

C
      WRITE(6,197)
  197      FORMAT(1X,1ENTER DATE OF TEST DD-MMM-YY (1B-NOV-77) 10)
      READ(5,571)(IHEAD(KK),KK=1,5)
  571      FORMAT(4A2,A1)
      WRITE(6,572)(IHEAD(KK),KK=1,5)
  572      FORMAT(1X,1THIS IS WHAT YOU SAID... 1,4A2,A1)
      WRITE(6,198)
  198      FORMAT(1X,1ENTER HEADER INFO...ABR1)
      READ(5,189)(IHEAD(KK),KK=6,30)
  189      FORMAT(25A2)
  191      FORMAT(I1)
      WRITE(6,199)
  199      FORMAT(1X,1**COPY TO DISK? TYPE N FOR NO, S FOR YES)
      READ(5,191)IPDP11

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193   WRITE(8,193)
      FORMAT(//1X,'***COPY TO PRINTER?..TYPE 8 FOR NO; 1 FOR YES')
      READ(8,195)IPDPLP
195   FORMAT(I2)
      IREFFOR
      IRESTOB
      IIRESTO=IREST
      WRITE(8,196)
196   FORMAT(//1X,'ENTER NLISTENERS,N8PEAKERS,N8SYSTEM,,I2I2I4',
      X/1X,'FOR EXAMPLE:88861184 FOLLOWED BY CARRIAGE RETURN')
      READ(8,202)NL,N8,L8Y8(1),L8Y8(2)
202   FORMAT(I2,I2,A2,A2)
      NAME(2)=L8Y8(2)
      DECODE(4,198A,L8Y8)I8Y8
198   FORMAT(4I1)
      IF(IPDPL1,EQ,1)CALL ASSIGN(S,NAME)
      DO 31K K=1,N8
      WRITE(8,203)K
203   FORMAT(1X,'ENTER KEY AND SPEAKER (E.G.,I1A2B8V) FOR SPEAKER',I2)
      READ(8,204)KEYN(K),KEYL(K),K8PK1(K),K8PK2(K)
204   FORMAT(I3,A1,A1,A1)
310   CONTINUE
      WRITE(8,205)(KEYN(K),KEYL(K),K8PK1(K),K8PK2(K),K=1,N8)
205   FORMAT(//1X,'CHECK THE KEYS...','/(1X,I3,A1,A1,A1)')
      PAUSE '***** READY TO GO *****'
      KLCTR8B
C
1   CONTINUE
      CALL ROPAGE
C
1981  CONTINUE
      IRECNO=IRECNO+1
C
      IPGNO=0
      DO 2 K=1,4
      IF(IPAGE(1,K+5A),EQ,1)IPGNO=IPGNO+K
2   CONTINUE
      IF(IPGNO,EQ,0)WRITE(8,296)
296   FORMAT(1X,'EOF. ENTER A TO GO OR 1 TO STOP')
      IF(IPGNO,EQ,0)READ(8,191)IBW
      IF(IPGNO,GT,4)PAUSE 'LOAD PAGEN, FIX&RESUME'
      IF(IPGNO,GT,4)GO TO 1
      IF(((IBW,AND,1),EQ,1),AND,IPGNO,EQ,0)GO TO 9999
      IF(IPGNO,EQ,0)GO TO 1
      IF(IREST,EQ,1)GO TO 21
      IF(((IPGNO-IOPGNO),EQ,1),OR,((IPGNO-IOPGNO),EQ,-3))GO TO 21
      IF(IPGNO,EQ,IOPGNO)GO TO 22
      WRITE(8,198)IUPGNO,IPGNO
198   FORMAT(//1X,'SEQUENCE ERROR PG ',I1,' TO ',I1)
      PAUSE 'LOAD RIGHT PAGE, RESUME'
      GO TO 7803
22   CONTINUE
471   FORMAT(1X,'DO YOU WANT TO END THE RUN? BON,1BY')
      WRITE(8,194)
      WRITE(8,471)
      READ(8,191)IQFLG
      IF(IQFLG,EQ,1)GO TO 9999
194   FORMAT(1X,'REDUNDANT PAGE IGNORED... ')
      GO TO 7803
21   CONTINUE
      IRESTOB
      IOPGNO=IPGNO
      IF(IPGNO,NE,1)GO TO 41

```

```

C      KLCTR=KLCTR+1
C
C      IDSY8=1000+ISY8(1)+100+ISY8(2)+10+ISY8(3)+ISY8(4)
C
C      ITEMP=MOD(KLCTR-1,N8)+1
C      IHDLST(1)=KEYN(ITEMP)/100
C      IHDLST(2)=MOD((KEYN(ITEMP)/10),10)
C      IHDLST(3)=MOD(KEYN(ITEMP1),10)
C      IHDLST(4)=KEYL(ITEMP),AND,MASK1
C
C      IDNL8=100+IHDLST(1)+10+IHDLST(2)+IHDLST(3)
C
C      DO 3002 KK=1,4
C      ILIBTN(KK)=0
C      DO 3002 K=1,10
C      IF(IPAGE(KK+5,K+36),EQ,1)ILISTN(KK)=K-1
C      CONTINUE
C      IDLIS=1000+ILISTN(1)+100+ILISTN(2)+10+ILISTN(3)+ILISTN(4)
C
C      ISPK(1)=KSPK1(ITEMP),AND,MASK1
C      ISPK(2)=KSPK2(ITEMP),AND,MASK1
C
C      9100 CONTINUE
C      ITEMP=NLI0(1)+1
C      DO 9110 KK=2,ITEMP
C      IF(IDLIS,EQ,NLI0(KK))GO TO 9200
C      9110 CONTINUE
C      WRITE(6,9100)IDLIS
C      9100 FORMAT(/1X,'HEADER ERROR,BAD LISTENER ID ',I4/1X,
C      X'ENTER CORRECTED ID... EXAMPLE(56951)
C      READ(5,9093)(ILISTN(ITEMP),ITEMP=1,4)
C      9093 FORMAT(4I1)
C      IDLIS=1000+ILISTN(1)+100+ILISTN(2)+10+ILISTN(3)+ILISTN(4)
C      GO TO 9100
C      9200 CONTINUE
C      IF(IERR(KK),LT,0)IERR(KK)=0
C
C      41 CONTINUE
C
C      DO 5 KK=1,29
C      ISUM=0
C      IF(IPAGE(KK+14,8),EQ,1)ISUM=ISUM+4
C      IF(IPAGE(KK+14,9),EQ,1)ISUM=ISUM+3
C      IF(IPAGE(KK+14,10),EQ,1)ISUM=ISUM+9
C      IF(IPAGE(KK+14,11),EQ,1)ISUM=ISUM+1
C      IF(IPAGE(KK+14,13),EQ,1)ISUM=ISUM+1
C      IF(IPAGE(KK+14,14),EQ,1)ISUM=ISUM+2
C      IF(IPAGE(KK+14,15),EQ,1)ISUM=ISUM+3
C      IF(IPAGE(KK+14,16),EQ,1)ISUM=ISUM+4
C      IF(IPAGE(KK+14,3),EQ,1)ISUM=ISUM
C      ICOL1(KK)=MOD(KK,2)
C      IF(ISUM,LT,0)ICOL1(KK)=0
C      IF(ISUM,GT,0)ICOL1(KK)=1
C      RRSP8=RRSP8+1,
C      IF(ISUM,NE,0)GO TO 5P1
C      RBDRSP=RBDRSP+1,
C      ITEMP=NLI0(1)+1
C      DO 61 K=2,ITEMP
C      IF(IDLIS,EQ,NLI0(K))IERR(K)=IERR(K)+1
C      CONTINUE

```

```

581    CONTINUE
5     CONTINUE
C
      DO 6 KK=1,29
      ISUM=0
      IF(IPAGE(KK+14,39).EQ.1)ISUM=ISUM+4
      IF(IPAGE(KK+14,40).EQ.1)ISUM=ISUM+3
      IF(IPAGE(KK+14,41).EQ.1)ISUM=ISUM+2
      IF(IPAGE(KK+14,42).EQ.1)ISUM=ISUM+1
      IF(IPAGE(KK+14,43).EQ.1)ISUM=ISUM+1
      IF(IPAGE(KK+14,45).EQ.1)ISUM=ISUM+2
      IF(IPAGE(KK+14,46).EQ.1)ISUM=ISUM+3
      IF(IPAGE(KK+14,47).EQ.1)ISUM=ISUM+4
      IF(IPAGE(KK+14,58).EQ.1)ISUM=ISUM
      ICOL2(KK)=MOD(KK,2)
      IF(ISUM.LT.0)ICOL2(KK)=0
      IF(ISUM.GT.0)ICOL2(KK)=1
      RRSP8=RRSP8+1,
      IF(ISUM.NE.0)GO TO 6A1
      RBDR8P=RBDR8P+1,
      ITEMP=NLID(1)+1
      DO 82 K=2,ITEMP
      IF(IDLT9.EQ.NLID(K))IERR(K)=IERR(K)+1
      CONTINUE
581   CONTINUE
6     CONTINUE
C
      IF(IPDPLP.EQ.0)GO TO 7001
      WRITE(4,90)IPGNO,108Y3,IALPH(IISPK(1)),IALPH(IISPK(2)),
      XIDLIS,I0NLIS,IALPH(IWDLST(4))
90     FORMAT(1H1/38X,5HPAGE ,I1,5H OF 4/
      X 1X,BMSYSTEMI ,I4/1X,8H$PEAKRI ,2A1/1X,
      X8MLISNERI ,I4/1X,8HHDLIST1 ,T3.A1//++)
      DO 7 K=1,29
      IF((ICOL1(K).EQ.0).AND.(ICOL9(K).EQ.0))WRITE(4,91)K,K
      IF((ICOL1(K).EQ.0).AND.(ICOL2(K).EQ.1))WRITE(4,92)K,K
      IF((ICOL1(K).EQ.1).AND.(ICOL9(K).EQ.0))WRITE(4,93)K,K
      IF((ICOL1(K).EQ.1).AND.(ICOL2(K).EQ.1))WRITE(4,94)K,K
      91     FORMAT(5X,I2,3H***,1AX,4HX ,16X,4HX ,1AX,3H***,I2)
      92     FORMAT(5X,I2,3H***,1AX,4HX ,16X,4H  X,1AX,3H***,I2)
      93     FORMAT(5X,I2,3H***,1AX,4H  X,16X,4HX ,1AX,3H***,I2)
      94     FORMAT(5X,I2,3H***,1AX,4H  X,16X,4H  X,1AX,3H***,I2)
      7     CONTINUE
C
      7001  CONTINUE
C
      9     CONTINUE
      IF(IPDPL1.NE.1)GO TO 7003
      IF(IPTTF1.EQ.0.OR.IIREST.EQ.1)GO TO 91P
      IPTTF1=0
      WRITE(3)NL,NS,(IHEAD(K),K=1,30)
      WRITE(1)NL,NS,(IHEAD(K),K=1,30)
91P     CONTINUE
      WRITE(3)(IE .NIV(K),K=1,NMAX)
      DO 3701 K=1,
      3701 IPACK(K)=0
      DO 3702 K=1,3
      DO 3702 NBITS=1,16
      IF(IEQUIV(16*K+NBITS).NE.0)IPACK(K)=IPACK(K),OR.,IRITS(NBITS)
      CONTINUE
      DO 3703 K=4,4
      DO 3703 NBITS=1,16
      IF(IEQUIV(16*K+NBITS).NE.0)IPACK(K)=IPACK(K),OR.,IRITS(NBITS)

```

```

3703  CONTINUE
      WRITE(1)(IEQUIV(K),K=1,18),(IPACK(K),K=1,4)
C
7003  CONTINUE
C
GO TO 1
C
9000  CONTINUE
      RTEMP=(RBDRSP/RRSPS)+1BB'.
      WRITE(6,200)RBDRSP,RRSPS,RTEMP,INSYS
200  FORMAT(1X,1 BAD MARK8,MARK8 X .. ',F7.0,1X,F7.0,1X,F5.1/
     X,1***SYSTEM # 1,I4)
      ITEMP=NLID(1)+1
      DO 63 KK=2,ITEMP
      RTEMP=(IERR(KK)/RBDRSP)+1BB'.
      IF(IERR(KK).GE.9)WRITE(6,201)NLID(KK),IERR(KK),RTEMP
201  FORMAT(1X,'LISTENER ',I4.5X,I4.' ERRORS',2X,' X',F5.1)
63   CONTINUE
      WRITE(6,9000)(MIN0(IAWANT(K),9),K=1,54)
9000  FORMAT(1X,10(5I1,1X),4I1)
      STOP '*** FINISHED ***'
END
SUBROUTINE RDPAGE
C
      DIMENSION ICOM(3)
      COMMON/CHARB/ICHARB(500)
      COMMON/IOPAGE/IARRAY(4000)
      DATA ICOM/'201,"003,"021/,ICR/"218/,IEP/"A12/
C
      IBASE=((("170500",AND,"77777")*60000)/2)+1
C
      CALL WAIT(4,2,MUMMY)
C
100  CONTINUE
      IARRAY(IBASE+2)="21
      IARRAY(IBASE+0)="21
      OLDTIM=SECNDS(0.)
      DO 103 K=1,3
101   CONTINUE
      IF((IARRAY(IBASE+2),AND,"2001,NE,"0000)) GO TO 102
      IF((SECNDS(0.)-OLDTIM).LT.,51 GO TO 101
      WRITE(6,1000)
1000  FORMAT(1X,'*** OMR NOT RECEIVING. YOU MUST RESET OMR.')
      PAUSE 'RES TO CONTINUE'
      GO TO 100
102  CONTINUE
      IARRAY(IBASE+3)=ICOM(K)
103  CONTINUE
C
      INX=1
      OLDTIM=SECNDS(0.)
      CONTINUE
      IF((IARRAY(IBASE+0),AND,"2001,EO,"0000)) GO TO 300
      ICHARB(INX)=IARRAY(IBASE+1),AND,"377
      TIME=SECNDS(0.)
      OLDTIM=TIME
      IF((ICHARB(INX),EO,ICR),AND,(INX.GT,1),AND,(ICHARB(INX+1)
      X,EO,IEP)) GO TO 400
      INX=INX+1
      GO TO 200
300  CONTINUE
      IF((SECNDS(0.)-OLDTIM),LE,15.) GO TO 200
      WRITE(6,1001)

```

```

1001 FORMAT(1X,1000 OMR NOT SENDING EP/CR. YOU MUST RESET OMR AND RE
      XREAD THE PAGE!)
      PAUSE !RES TO CONTINUE!
      GO TO 100
100  CONTINUE
      CALL SCAN(IERRFG,INX)
      IF(IERRFG,EQ.1)GO TO 100
      RETURN
      END
      SUBROUTINE SCAN(IERRFG,INX)
      DIMENSION IBITS(6)
      COMMON/CHARB/ICHARB(500)
      COMMON/PAGE/IPAGE(46,54)
      COMMON/ERROR8/IAWANT(54)
      DATA IBITS/"40,"20,"10,"4,"2,"1/
C      IVAL(K)=ICHARB(K),AND,"77
C      DO 99 K=1,46
C      DO 99 KK=1,54
C      IPAGE(K,KK)=0
C      IROW=1
C      NPTR=0
100  CONTINUE
      NPTR=NPTR+1
      IF(ICHARB(NPTR),EQ."215")GO TO 200
      IF(NPTR,LT,INX)GO TO 100
      STOP !IMPOSSIBLE!
200  CONTINUE
      MPTR=NPTR
201  CONTINUE
      MPTR=MPTR+1
      IF(ICHARB(MPTR),EQ."215")GO TO 300
      IF(MPTR,LT,INX)GO TO 201
      STOP !IMPOSSIBLE!
300  CONTINUE
      N=((MPTR-NPTR)+1)/10
      NPTR=NPTR+1
      DO 301 KKK=1,N
      ITEMP=IVAL(NPTR+1)+0*(KKK+1)
      IF(ITEMP,GT,IROW)GO TO 300
      IAWANT(IROW+1)=IAWANT(IROW+1)+1
      GO TO 301
3001 CONTINUE
      IROW=ITEMP
      DO 301 K=1,9
      DO 301 KK=1,6
      IF((IBITS(KK),AND,ICHARB(NPTR+1)+0*(KKK+1)+K)),NE,0)
      XIPAGE(IROW+1,6*(K+1)+KK)=1
301  CONTINUE
      NPTR=MPTR+1
      IF(MPTR,LT,INX)GO TO 100
      IERRFG=0
      NROWER=0
      DO 401 K=15,43
      DO 400 KK=1,54
      IF(IPAGE(K,KK),EQ,1)GO TO 401
400  CONTINUE
      NROWER=NROWER+1
401  CONTINUE
      IF(NROWER,LE,1)RETURN
      WRITE(6,1000)NROWER

```

```
1088 FORMAT(1X,1400 1,I8,1 MISSED RESPONSE ROWS ON THIS PAGE,1/  
     X1X,1TYPE IN A 1 TO REREAD THE PAGE  
     X1X,1TYPE IN A R TO ACCEPT PAGE AS IS...1)  
     READ(5,1081)ITEMP  
1081 FORMAT(I1)  
     IF(ITEMP.EQ.1)RETURN  
     PAUSE 1RES TO CONTINUE!  
     IERRFG=1  
     RETURN  
     END
```

\*\* R8X=11M V03 \*\* 21-MAR-78 13148154 DPA1(200,200) XFER,FTN1504  
\*\* R8X=11M V03 \*\* 21-MAR-78 13148154 DPA1(200,200) XFER,FTN1504  
\*\* R8X=11M V03 \*\* 21-MAR-78 13148154 DPA1(200,200) XFER,FTN1504

X X FFFFF EEEEE RRRR  
X X F E R R  
X X F E R R  
X FFFFF EEEEE RRRR  
X X F E R R  
X X F E R R  
X X F EEEEE R R

FFFFF TTTTT N N 11 55555 000 4 4  
F T N N N 11 5 0 0 4 4  
F T N N N 555 0 0 4 4  
FFFF T N N N 11 3 0 0 0 44444  
F T N NN 11 5 0 0 0 4  
F T N N 11 0 5 0 0 4  
F T N N 1 555 000 4

\*\* R8X=11M V03 \*\* 21-MAR-78 13148154 DPA1(200,200) XFER,FTN1504  
\*\* R8X=11M V03 \*\* 21-MAR-78 13148154 DPA1(200,200) XFER,FTN1504  
\*\* R8X=11M V03 \*\* 21-MAR-78 13148154 DPA1(200,200) XFER,FTN1504

```

C
LOGICAL•1 KVRADL,KVGODL
DIMENSION IEQUIV(74)
DIMENSION NAME(4),LSYS(2),IHEAD(30),LDEL(2M),LSDEL(8)
DIMENSION ISYS(4),IWDLST(4),ISPK(2),ILISTN(4),
X ICOL1(29),ICOL2(29)
EQUIVALENCE (IRECNO,IEQUIV(1)),(IPGN0,IEQUIV(2)),
X (ISYS(1),IEQUIV(3)),(IWDLST(1),IEQUIV(7)),
X (ISPK(1),IEQUIV(11)),(ILISTN(1),IEQUIV(13)),
X (ICOL1(1),IEQUIV(17)),(ICOL2(1),IEQUIV(48))
DATA MASK//377/,H100//100/
DATA IGNORE,ISTART,ISTOP,IRDROP,IFNDFL
X //100000,"100001,"100002,"100003,"100010/
DATA NAME(1),NAME(2),NAME(3),NAME(4)/2HZ.,P,0,0/
C
CALL ASSIGN(3,'DF1')
CALL ASSIGN(4,'UF1')
CALL ASSIGN(5,'TI1')
CALL ASSIGN(6,'TI1')
KEYBAD=0
IOLID=0
ICSP=0
IOSID1=0
IOSID2=0
DO 1A1 K=1,6
1A1 LSDEL(K)=0
DO 1A2 K=1,20
1A2 LDEL(K)=0
C
      WRITE(6,190)
190  FORMAT(/1X,
X1X,1ENTER SYSTEM ID ..,I4)
READ(5,191)L8YS(1),L8YS(2)
191  FORMAT(A2,A2)
NAME(2)=L8YS(2)
DECODE(4,199A,L8YS)ISYSIN
1990 FORMAT(I4)
CALL ASSIGN(3,NAME)
READ(3)NL,NB,(IHEAD(K),K=1,30)
WRITE(6,199A)(IHEAD(K),K=1,30)
1994 FORMAT(/1X,3RA2/)
WRITE(6,192)
192  FORMAT(/1X,'HOW MANY LISTENERS TO DELETE.,I2')
READ(5,193)NDEL
193  FORMAT(I2)
WRITE(6,179)
179  FORMAT(/1X,'HOW MANY SPEAKERS TO DELETE.,I2')
READ(5,193)NSDEL
IF(NDEL.LE.0)GO TO 309
DO 308 K=1,NDEL
WRITE(6,194)
194  FORMAT(/1X,'ENTER LISTENER ID TO DELETE.,I4)
READ(5,195)LDEL(K)
195  FORMAT(I4)
308  CONTINUE
309  CONTINUE
IF(NSDEL.LE.0)GO TO 310
DO 3101 K=1,NSDEL
WRITE(6,196)
196  FORMAT(/1X,'ENTER SPEAKER TO DELETE.,A2')
READ(5,197)L8DEL(K)
FORMAT(A2)

```

```

3H91    CONTINUE
310    CONTINUE
      WRITE(6,196)
196    FORMAT(/IX,!ENTER ANY INCORRECT-CORRECTED KEY PAIR (0 IF OK)!)
      READ(5,197)KYRAD,KYBADL,KYGOOD,KYGDL
197    FORMAT(I3,A1,I3,A1)
      NL=NL-NDEL
      NS=NS-NDEL

C
      IF(ICSP,EO,1)CALL CSPIO(1,ISTART)
      IDATA=ISYSID,AND,MASK
      IF(ICSP,EO,1)CALL CSPIO(1,IData)
      IDATA=ISHFT(ISYSID,-8)
      IF(ICSP,EO,1)CALL CSPIO(1,IData)
      IDATA=NL,AND,MASK
      IF(ICSP,EO,1)CALL CSPIO(1,IData)
      IDATA=ISHFT(NL,-8)
      IF(ICSP,EO,1)CALL CSPIO(1,IData)
      IDATA=NS,AND,MASK
      IF(ICSP,EO,1)CALL CSPIO(1,IData)
      IDATA=ISHFT(NS,-8)
      IF(ICSP,EO,1)CALL CSPIO(1,IData)
      DO 89 K=1,39
      IDATA=ISHFT(IHEAD(K),-8)
      IF(ICSP,EO,1)CALL CSPIO(1,IData)
      IDATA=IHEAD(K),AND,MASK
      IF(ICSP,EO,1)CALL CSPIO(1,IData)
89     CONTINUE
      IF(ICSP,EO,1)CALL CSPIO(1,ISTOP)
      IF(ICSP,EO,0)WRITE(4,8000)ISYSID,NL,NS,(IHEAD(K),K=1,39)
      FORMAT(I4,I3,I3,39A2)

C
1     CONTINUE
      READ(3,END=999)(IEQUIV(K),K=1,74)
      IF(IPGND,NE,1)GO TO 2
      ITLID=1MRA+ILISTN(1)+1MRA+ILISTN(2)+1MRA+ILISTN(3)+ILISTN(4)
      IIDATA=ISHFT(((IEQUIV(12),AND,MASK)+M1RA),8)+X((IEQUIV(11),AND,MASK)+M1RA)
      IF(NSDEL,LE,R)GO TO 109
      DO 1091 K=1,NSDEL
      IF(IIData,EQ,LSDFL(K))GO TO 1
1091  CONTINUE
109   CONTINUE
      IF(NDEL,LE,R)GO TO 119
      DO 11 K=1,NDEL
      IF(ITLID,EQ,LDEL(K))GO TO 1
11    CONTINUE
110   CONTINUE
      IF(ITLID,NE,IOLIN)GO TO 31
21    CONTINUE
      GO TO 32
22    CONTINUE
2    CONTINUE
      IF(NSDEL,LE,R)GO TO 211
      DO 211R K=1,NSDEL
      IF(IIData,EQ,LSDEL(K))GO TO 1
211R  CONTINUE
211   CONTINUE
      IF(NDEL,LE,R)GO TO 219
      DO 12 K=1,NDEL
      IF(ITLID,EQ,LDEL(K))GO TO 1
12    CONTINUE
219   CONTINUE

```

```

IF(ICSP,EQ,1)CALL CSPIN(1,ISTART)
DO 3 K=17,74
IDATA=IEQUIV(K),AND,MASK
IF(ICSP,EQ,1)CALL CSPIN(1,IData)
IData=ISHFT(IEQUIV(K),-R)
IF(ICSP,F0,1)CALL CSPIN(1,IData)
CONTINUE
IF(ICSP,F0,1)CALL CSPIN(1,ISTOP)
IF(ICSP,F0,1)WRITE(4,80H1)(IEQUIV(K),K=17,74)
FORMAT(80H1)
GO TO 1
C
31 CONTINUE
IF(ICSP,F0,1)CALL CSPIN(1,ISTART)
IData=ITLID,AND,MASK
IF(ICSP,F0,1)CALL CSPIN(1,IData)
IData=ISHFT(ITLID,-R)
IF(ICSP,F0,1)CALL CSPIN(1,IData)
IF(ICSP,F0,1)CALL CSPIN(1,ISTOP)
IF(ICSP,F0,1)WRITE(4,80H2)ITLID
FORMAT(14)
ITLID=ITLID
GO TO 21
C
32 CONTINUE
IF(ICSP,EQ,1)CALL CSPIN(1,ISTART)
IData=(IEQUIV(12),AND,MASK)+M100
IF(ICSP,F0,1)CALL CSPIN(1,IData)
IData=(IEQUIV(11),AND,MASK)+M100
IF(ICSP,F0,1)CALL CSPIN(1,IData)
IData=ISHFT(((IEQUIV(12),AND,MASK)+M100),R)+X((IEQUIV(11),AND,MASK)+M100)
IKFYN=M100+IEQUIV(7)+1+IEQUIV(8)+IEQUIV(9)
IF(IKEYN,EQ,KYHAD)KEYBAD=1
IF(IKEYN,EQ,KYRAD)IKEYN=KYGOOD
IData=IKEYN,AND,MASK
IF(ICSP,EQ,1)CALL CSPIN(1,IData)
IData=ISHFT(IKEYN,-8)
IF(ICSP,F0,1)CALL CSPIN(1,IData)
IData=(IEQUIV(10),AND,MASK)+M100
IKEVL=ISHFT(((IEQUIV(10),AND,MASK)+M100),-R)+X((IEQUIV(10),AND,MASK)+M100)
IF(KEYRAD,EQ,1)IKEVL=KYGOOD
KEYBAD=0
IF(ICSP,EQ,1)CALL CSPIN(1,IData)
IF(ICSP,F0,1)CALL CSPIN(1,IData)
IF(ICSP,EQ,1)CALL CSPIN(1,ISTOP)
C
C
IF(ICSP,EQ,0)WRITE(4,80H0)IData,IKEYN,IKEVL
FORMAT(42,T3,A1,A1)
IOSID1=ISPK(1)
IOSID2=ISPK(2)
GO TO 22
C
999 CONTINUE
IF(ICSP,EQ,1)CALL CSPIN(1,TENDFL)
IF(ICSP,EQ,1)CALL CSPIN(1,TENDFL)
IF(ICSP,F0,1)ENDFILE 4
IF(ICSP,F0,1)ENDFILE 4
STOP
END

```

\*\* RSX=11M V03 \*\* 21-MAR-78 13149129 DFB1[200,200] SCORE,FTN17  
 \*\* RSX=11M V03 \*\* 21-MAR-78 13149129 DFB1[200,200] SCORE,FTN17  
 \*\* RSX=11M V03 \*\* 21-MAR-78 13149129 DFB1[200,200] SCORE,FTN17

SSSSSSSS	CCCCCCCC	000000	RRRRRRRR	EEEEEEEE
SSSSSSSS	CCCCCCCC	000000	RRRRRRRR	FFFFEEEE
SS	CC	00	RR	EE
SS	CC	00	RR	EE
SS	CC	00	RR	EE
SS	CC	00	RR	EE
SSSSSS	CC	00	RRRRRRRR	EEEEEE
SSSSSS	CC	00	RRRRRRRR	FFFFEE
SS	CC	00	RR RR	EE
SS	CC	00	RR RR	EE
SS	CC	00	RR RR	EE
SS	CC	00	RR RR	EE
SSSSSSSS	CCCCCCCC	000000	RR	EEEEEEEEE
SSSSSSSS	CCCCCCCC	000000	RR	FFFFEEEEE

FFFFFFFFF	TTTTTTTTTT	NN	NN	TTT	77777777
FFFFFFFFF	TTTTTTTTTT	NN	NN	TTT	77777777
FF	TT	NN	NN	TTT	77
FF	TT	NN	NN	TTT	77
FF	TT	NNNN	NN	TTT	77
FF	TT	NNNN	NN	TTT	77
FF	TT	NN NN NN	NN	TTT	77
FF	TT	NN NN NN	NN	TTT	77
FF	TT	NN NNNN	NN	TTT	77
FF	TT	NN NNNN	NN	TTT	77
FF	TT	NN NN	NN	TT	77
FF	TT	NN NN	NN	TT	77
FF	TT	NN NN	NN	TT	77
FF	TT	NN NN	NN	TT	77

\*\* RSX=11M V03 \*\* 21-MAR-78 13149129 DFB1[200,200] SCORF,FTN17  
 \*\* RSX=11M V03 \*\* 21-MAR-78 13149129 DFB1[200,200] SCORF,FTN17  
 \*\* RSX=11M V03 \*\* 21-MAR-78 13149129 DFB1[200,200] SCORF,FTN17

```

C
COMMON/A/IDSYS,ISYS(50),NAME(15),NPAGE(7,2,3),
X ISPK(15,9),MKFY,LETTER,LIST,ISPK,NUML,NIMS,ARRAY(6A),IRESP(2,29),
XDATA(12,6,3A)
C
CALL ASSIGN(3,1DEFINENKEY,KEY1)
CALL ASSIGN(4,1DEF1)
TCOMB
CONTINUE
CALL CTLT(TCOM)
CALL SCORE(TCOM)
[FT]TCOM,FQ,W)CALL MATH
GO TO 1
END
SUBROUTINE CTL(TCOM)

```

DIAGNOSTIC WHVME TEST SCORING PROGRAM

3 DEC 78

STEVEN MEISTER, FSD/MCEL, HANSCOM AFB, MA 01731

NUMSUM = NUMBER OF SUBFEATURES CORRECT EACH LISTENER  
NUMT = NUMBER OF MAIN FEATURES CORRECT EACH LISTENER  
NUML = NUMBER OF LISTENERS  
NIMS = NUMBER OF SPEAKERS  
LIST = CURRENT LISTENER  
ISPKR = CURRENT SPEAKER  
TKEY = CURRENT KEY NUMBER  
NKEY = CURRENT KEY INDEX NUMBER FOR KEY ARRAY  
NPAGE = PAGE BEING SCORED  
IFFAT = INDEX FOR MAIN FEATURES  
 1 = VOICING  
 2 = NASALITY  
 3 = SUSTENTION  
 4 = SIBILATION  
 5 = GRAVENESS  
 6 = COMPACTNESS  
 7 = EXPERIMENTAL

FEATURE ARRAY KEYS:

	PRESENT	ABSENT	
MAIN FEATURE	(L,1,1)	(L,2,1)	L = LISTENER NUMBER
SUR FEAT PRES	(L,1,2)	(L,2,2)	
SUR FEAT ABS	(L,1,3)	(L,2,3)	

FEAT(10,N,M) = MEAN FOR N,M  
FEAT(20,N,M) = STANDARD ERROR FOR N,M  
FEAT(1R,1,M) = MEAN FOR PRESENT + ABSENT STATE OF M  
FEAT(1R,2,M) = S.E. FOR PRESENT + ABSENT STATE OF M

```

C PAGE(I,J,K) AND NPAGE(I,J,K)
C   I = FEATURE
C   J = 11PRESENT 21ARSENT
C   K = 18MATH 21SUR PHES 31SUR ARS
C
C
C   DIMENSION KEY(58),KEYSUB(58,2)
C   DIMENSION NEWKEY(58,60)
C
C
C   COMMON/A/IDSYS,TSYSTE(50),NAME(15),
1   NPAGE(7,2,3), MSPK(15,0),MKEY,LETTER,
1   LIST,ISPK,NUML,NUMS,ARRAY(80),IRFSP(2,29),DATA(12,6,36)
1   INTEGER ANSWER
C
C
C
C   DATA IALPHA,IALPHB/2HAA,2HBB/
C   SUB FEATURES KEY
C   DATA KEYSUR/0,0,1,0,1,0,3+0,3+0,1,1,5+0,1,0,1,1,4+0,1,3+0,3+0,
1   1,3+0,1,0,1,0,1,3+0,7+0,1,0,1,4+0,1,1,0,1,0,1,3+0,1,0,1,3+0,1,1,
1   0,1,0,1,1,0,4+1,3+0,1,3+0,3+0,1,0,3+1,0,3+1,0,1,3+0,1,0,4+1/
C
C   READI SYSTEM, NUMBER LISTENERS, NUMBER SPEAKERS
C
C   IF(ICOM.NE.8)GO TO 1040
C   LIST=0
C   CALL ASSTGN(6,'DF011')
C
C   READ(3)NEWKEY
C   READ(4,103)IDSYS,NUML,NUMS,(TSYSTE(I1,I1+1,30))
103  FORMAT(14,I3,I3,3HAA2)
1080 CONTINUE
C   IF((LIST+1).GT.NUML)GO TO 200
C   LIST=LIST+1
C   ISPK=0
C
C   READ LISTENER ID
C
C   READ(4,104)NAME(I1IST)
104  FORMAT(14)
1040 CONTINUE
C   IF((ISPK+1).GT.NUMS)GO TO 1080
C   ISPK=ISPK+1
C   DO 610 I=1,7
C   DO 610 J=1,2
C   DO 610 K=1,3
610  NPAGE(I,J,K) = 0
C
C   READ SPEAKER NAME, KEY NUMBER AND LETTER
C
C   READ(4,103N)MSPK(LIST,ISPK),NKFY,LETTER
103N FORMAT(A2,T3,A2)
C   MKEY = NKEY
C   DO 801 KK=102,108
C   IF(NKEY.NE.KK)GO TO 801
C   NKFY=2+(KK-102)+1
C   GO TO 100
801  CONTINUE

```

```

807 IF(NKEY,NE,111)GO TO 808
NKEY=15
GO TO 150
808 IF(NKEY,NE,112)GO TO 809
NKEY=17
GO TO 150
809 IF(NKEY,NE,113)GO TO 810
NKEY=19
GO TO 150
810 IF(NKEY,NE,115)GO TO 811
NKEY=21
GO TO 150
811 IF(NKEY,NE,116)GO TO 812
NKFY=23
GO TO 150
812 IF(NKEY,GT,318)GO TO 151
IF(NKEY,LE,304)GO TO 151
NKEY=25+2*(NKEY-304)
GO TO 150
150 IF(LETTER,NE,IALPHA)GO TO 1501
NKEY=NKEY+1
GO TO 152
1501 IF(LETTER,FO,IALPHA)GO TO 152
151 WRITE(5,300)NKEY,LETTER
300 FORMAT(//I, ***** NO KEY !,I3,A1,*****//)
STOP
152 CONTINUE
C
C
C
1527 DO 1527 K=1,58
KEY(K)=NEWKEY(K,NKEY)
C
C
C
DO 114 IPAGE = 1,4
C
READ CURRENT PAGE
C
106 READ(4,107)((IRESP(ICOL,IROW),IROW=1,29),ICOL=1,21
C
C
C
C
C
C
107 FORMAT(5A11)
DO 203 ICOL=1,2
DO 204 IRONW =2,29
C ESTABLISH FEATURE BEING SCORED
IF(IRONW,LE,8)IFEAT=IRONW-1
ITEMP =IRONW-1
IFEAT=MOD(ITEMP,7)
IF(IFEAT,EQ,0)IFEAT=7
C ESTABLISH WHICH COLUMN PRESENT STATE OF FEATURE IS IN,
IPRES=1
IF(IPAGE,LE,2)IPRES=0
C FIND KEY ELEMENT
KEYEL=IRONW
IFF(ICOL,EQ,2)KEYFL=IRONW+29
INDEX = 2
IF(IPAGE,EQ,1)GOTO 208
IF(IPAGE,EQ,3)GOTO 208

```

```

        IF (KEY(KEYFL),NE,IPRES) INDEX=1
        GOTO 299
298  IF (KEY(KEYEL),EQ,IPRES) INDEX=1
      INDEX =1 IMPLIES MAIN FEATURE PRESENT; 2 IMPLIES ABSENT.
      SCORE THE RESPONSE
299  ANSWER = A
      IF (IPAGE,EQ,1) GOTO 295
      IF (IPAGE,EQ,3) GOTO 295
      IF (KEY(KEYEL),NE,IRES(P/TCOL,IRW)) ANSFR=1
      GOTO 294
294  IF (KEY(KEYEL),EQ,IRES(P/TCOL,IRW)) ANSFR=1
295  CONTINUE
      IF (IFEA,EQ,7) GOTO 257
      ISUHP=2
      NSUHP=2
      IF (IPAGE,EQ,1) ISUHP=1
      IF (IPAGE,EQ,3) ISUHP=1
      IF (KEYS(1)(KEYEL,ISUHP),EQ,0) NSUHP=3
      GOTO(251,252,253,254,255,256,257),IFFAT
251  NPAGE(1,TINDEX,1)=NPAGE(1,INDEX,1)+ANSWER
      NPAGE(1,TINDEX,NSUHP)=NPAGE(1,INDEX,NSUHP)+ANSWER
      GOTO 280
252  NPAGE(2,TINDEX,1)=NPAGE(2,INDEX,1)+ANSWER
      NPAGE(2,TINDEX,NSUHP)=NPAGE(2,INDEX,NSUHP)+ANSWER
      GOTO 280
253  NPAGE(3,TINDEX,1)=NPAGE(3,INDEX,1)+ANSWER
      NPAGE(3,TINDEX,NSUHP)=NPAGE(3,INDEX,NSUHP)+ANSWER
      GOTO 280
254  NPAGE(4,TINDEX,1)=NPAGE(4,INDEX,1)+ANSWER
      NPAGE(4,TINDEX,NSUHP)=NPAGE(4,INDEX,NSUHP)+ANSWER
      GOTO 280
255  NPAGE(5,TINDEX,1)=NPAGE(5,INDEX,1)+ANSWER
      NPAGE(5,TINDEX,NSUHP)=NPAGE(5,INDEX,NSUHP)+ANSWER
      GOTO 280
256  NPAGE(6,TINDEX,1)=NPAGE(6,INDEX,1)+ANSWER
      NPAGE(6,TINDEX,NSUHP)=NPAGE(6,INDEX,NSUHP)+ANSWER
      GOTO 280
257  NPAGE(7,TINDEX,1)=NPAGE(7,INDEX,1)+ANSWER
260  CONTINUE
261  CONTINUE
262  CONTINUE
C
C
C
C
110  CONTINUE
F
C
C
C
ICOM=1
RETURN
C
C
C
263  CONTINUE
C
C
C
264  CONTINUE
ICOM=2
RETURN
END
SUBROUTINE SCORE(PLACE)

```

```

C
C
COMMON/A/IDSYS,ISYS(50),NAME(15),NPAGE(7,2,3),
1NSPK(15,9),MKEY,LETTER,LIST,ISPK,NUML,NUMS,ARRAY(60),IRESP(2,29),
XDATA(12,6,36)
      DIMENSION SEND(6),TEMP(2,9)
      IF(INPLACE,NE,1)GOTO 2
      1   FORMAT(' SYSTEM TESTER: ',14,3X,30A2//5X,'NUMBER LISTENERS =',I3/
      1   5X,'NUMBER SPEAKERS =',I3//)
5000  FORMAT(IH1)
5000  CONTINUE
      DO 20 I=1,6
      DO 22 K=1,3
      DO 41 J=1,2
      L = 6+I+J+2*K-8
      NTOT = 16
      IF(K,NE,1)NTOT=8
C
C
C
C
      61   TOT = FLOAT(NTOT)
      DATA(LIST,ISPK,L)=F2.0*FLOAT(NPAGE(I,J,K))-TOT)+100./TOT
      NPAGE(I,J,K) = TOT-NPAGE(I,J,K)
      41   CONTINUE
      22   CONTINUE
      20   CONTINUE
      IF((ISW,AND,1).EQ.0)RETURN
      0   WRITE(6,276)
      0   WRITE(6,277)(NPAGE(1,J,1),J=1,2)
      0   WRITE(6,278)(NPAGE(1,J,2),J=1,2)
      0   WRITE(6,279)(NPAGE(1,J,3),J=1,2)
      0   WRITE(6,280)(NPAGE(2,J,1),J=1,2)
      0   WRITE(6,281)(NPAGE(2,J,2),J=1,2)
      0   WRITE(6,282)(NPAGE(2,J,3),J=1,2)
      0   WRITE(6,283)(NPAGE(3,J,1),J=1,2)
      0   WRITE(6,284)(NPAGE(3,J,2),J=1,2)
      0   WRITE(6,285)(NPAGE(3,J,3),J=1,2)
      0   WRITE(6,286)(NPAGE(4,J,1),J=1,2)
      0   WRITE(6,287)(NPAGE(4,J,2),J=1,2)
      0   WRITE(6,288)(NPAGE(4,J,3),J=1,2)
      0   WRITE(6,289)(NPAGE(5,J,1),J=1,2)
      0   WRITE(6,290)(NPAGE(5,J,2),J=1,2)
      0   WRITE(6,291)(NPAGE(5,J,3),J=1,2)
      0   WRITE(6,292)(NPAGE(6,J,1),J=1,2)
      0   WRITE(6,293)(NPAGE(6,J,2),J=1,2)
      0   WRITE(6,294)(NPAGE(6,J,3),J=1,2)
      0   WRITE(6,295)(NPAGE(7,J,1),J=1,2)
      0   WRITE(6,296)(NPAGE(7,J,2),J=1,2)
      0   WRITE(6,297)(NPAGE(7,J,3),J=1,2)
      021  FORMAT(1UX,15,5X,T5)
C
C
C
C
      0   RETURN
      2   CONTINUE
      DO 200 LIST=1,NUML
      WRITE(6,500)
      WRITE(6,1)IDSYS,(ISYS(J),J=1,30),NUML,NUMS
      WRITE(6,201)NAME(LIST)
      201  FORMAT(13X,7(I1+1)// FOR LISTENER I,I4,I+1/
      1   13X,7(I1+1)//)
      1   1 SPKR SCORE//)
      DO 204 ISPKR=1,NUMS
      SUM = 0.0

```

```

      DO 202 I=1,31,6
      J=I+1
202  SUM = SUM + DATA(LIST,ISPKR,I) + DATA(LIST,ISPKR,J)
      SUM = SUM/12.0
      WRITE(6,203)ISPKR(LIST,ISPKR),SUM
203  FORMAT(1X,A2,1X,F7.2)
204  CONTINUE
      WRITE(6,403)
      WRITE(6,404)
      DO 209 I=1,6
209  SEND(I)=0.0
      DO 210 I=1,35,2
      J=I+1
      DO 211 K=1,NIHS
211  ARRAY(K)=DATA(LIST,K,I)
      CALL STATS(NIHS,X,S)
      SEND(1)=X
      SEND(2)=S
      DO 212 K=1,NIHS
212  ARRAY(K)=DATA(LIST,K,J)
      CALL STATS(NIHS,X,S)
      SEND(3)=X
      SEND(4)=S
      DO 213 K=1,NIHS
213  ARRAY(K)=(ARRAY(K)+DATA(LIST,K,I))/2.0
      CALL STATS(NIHS,X,S)
      SEND(5)=X
      SEND(6)=S
      CALL OUT(1,SEND)
214  CONTINUE
      DO 215 K=1,NIHS
      SUM = 0.0
      DO 216 I=1,31,6
216  SUM = SUM + DATA(LIST,K,I)
      ARRAY(K) = SUM/K.0
      CALL STATS(NIHS,X,S)
      SEND(1)=X
      SEND(2)=S
      DO 217 K=1,NIHS
217  SUM = SUM + DATA(LIST,K,I)
      ARRAY(K) = SUM/K.0
      CALL STATS(NIHS,X,S)
      SEND(3)=X
      SEND(4)=S
      DO 218 K=1,NIHS
218  SUM = SUM + DATA(LIST,K,I) + DATA(LIST,K,J)
      ARRAY(K) = SUM/12.0
      CALL STATS(NIHS,X,S)
      SEND(5)=X
      SEND(6)=S
      CALL OUT(36,SEND)
      WRITE(6,400)Y,S
207  CONTINUE
      DO 300 ISPKR = 1,NIHS
      WRITE(6,500)
      WRITE(6,1)IDSYS,(ISYS(I),I=1,30),NIHL,NIHS
      WRITE(6,301)ISPKR(1,ISPKH)
      FORMAT(12X,'*****!/ FOR SPEAKER ',A2,' *!/

```

```

1 12X,1*...!//! LISTENER1.AX,! SCORE!/)
DO 304 LIST = 1,NUML
SUM = 0.0
DO 302 I=1,31,6
J=I+1
302 SUM = SUM+DATA(LIST,ISPKR,I)+DATA(LIST,ISPKR,J)
SUM = SUM/12.0
WRITE(6,303)NAME(LIST),SUM
FORMAT(1Y,14.6,F7.2)
303 FORMAT(1Y,14.6,F7.2)
304 CONTINUE
WRITE(6,403)
WRITE(6,404)
DO 310 I=1,35,2
J=I+1
DO 311 K=1,NUML
ARRAY(K)=DATA(K,ISPKR,I)
CALL STATS(NUML,Y,S)
SEND(1)=Y
SEND(2)=S
DO 312 K=1,NUML
ARRAY(K)=DATA(K,ISPKR,J)
CALL STATS(NUML,Y,S)
SEND(3)=Y
SEND(4)=S
DO 313 K=1,NUML
ARRAY(K) = (ARRAY(K)+DATA(K,ISPKR,I))/2.0
CALL STATS(NUML,Y,S)
SEND(5)=Y
SEND(6)=S
CALL OUT(I,SEND)
310 CONTINUE
DO 315 K=1,NUML
SUM = 0.0
DO 314 I=1,31,6
SUM = SUM + DATA(K,ISPKR,I)
ARRAY(K) = SUM/6.0
CALL STATS(NUML,Y,S)
SEND(1)=Y
SEND(2)=S
DO 316 K=1,NUML
SUM = 0.0
DO 317 I=2,32,6
SUM = SUM+DATA(K,ISPKR,I)
ARRAY(K)=SUM/6.0
CALL STATS(NUML,Y,S)
SEND(3)=Y
SEND(4)=S
DO 319 K=1,NUML
SUM = 0.0
DO 318 I=1,31,6
J=I+1
SUM = SUM+DATA(K,ISPKR,I)+DATA(K,ISPKR,J)
ARRAY(K)=SUM/12.0
CALL STATS(NUML,Y,S)
SEND(5)=Y
SEND(6)=S
CALL OUT(3A,SEND)
WRITE(6,400)Y,S
TEMP(1,ISPKR)=Y
TEMP(2,ISPKR)=S
300 CONTINUE
WRITE(6,500)
WRITE(6,1)IDSYS,(TSYS(I),I=1,30),NUML,NUMS

```

```

      WRITE(6,320)
320  FORMAT(' COMBINED RESULTS - STANDARD ERRORS ACROSS ',  

     1'SPEAKERS AND 1 TESTFRS *****')
      WRITE(6,403)
      WRITE(6,404)
      NIHT = NIHL+NUMS
      DO 321 I=1,35,2
      J=I+1
      DO 322 K=1,NIHL
      DO 322 L=1,NUMS
      M=NUMS*(K-1)+L
322  ARRAY(M)=DATA(K,L,I)
      CALL STATS(NIHT,X,S)
      SEND(1)=X
      SEND(2)=S
      DO 323 K=1,NIHL
      DO 323 L=1,NUMS
      M=NUMS*(K-1)+L
323  ARRAY(M)=DATA(K,L,J)
      CALL STATS(NIHT,X,S)
      SEND(3)=X
      SEND(4)=S
      DO 324 K=1,NIHL
      DO 324 L=1,NUMS
      M=NUMS*(K-1)+L
      SUM = DATA(K,L,I)+DATA(K,L,J)
324  ARRAY(M)=SUM/2.n
      CALL STATS(NIHT,X,S)
      SEND(5)=X
      SEND(6)=S
      CALL OUT(I,SEND)
321  CONTINUE
      DO 325 K=1,NIHL
      DO 325 L=1,NUMS
      M=NUMS*(K-1)+L
      SUM = 0.a
      DO 326 I=1,31,b
      SUM = SUM+DATA(K,L,I)
326  ARRAY(M)=SUM/31.n
      CALL STATS(NIHT,X,S)
      SEND(1)=X
      SEND(2)=S
      DO 327 K=1,NIHL
      DO 327 L=1,NUMS
      M=NUMS*(K-1)+L
      SUM=0.a
      DO 328 I=2,32,b
      SUM = SUM + DATA(K,L,I)
328  ARRAY(M)=SUM/31.n
      CALL STATS(NIHT,X,S)
      SEND(3)=X
      SEND(4)=S
      DO 329 K=1,NIHL
      DO 329 L=1,NUMS
      M=NUMS*(K-1)+L
      SUM=0.a
      DO 330 I=1,31,b
      J=I+1
      SUM = SUM+DATA(K,L,I)+DATA(K,L,J)
330  ARRAY(M)=SUM/12.a
      CALL STATS(NIHT,X,S)
      SEND(5)=X
      SEND(6)=S

```

```

CALL OUT(SR,SEND)
WRITE(B,400)X,S
WRITE(B,501)(MSPK(1,J1),J=1,NIUMS)
WRITE(B,502)(TEHP(1,K),K=1,NIUMS)
WRITE(B,503)(TEHP(2,K),K=1,NIUMS)
501 FORMAT(//9X,9(A2,5X))
502 FORMAT(// MEAN 1,9(2X,F5.2))
503 FORMAT(// S.E. 1,9(2X,F5.2))
NPLACE=0
RETURN
276 FORMAT(10X,'MAIN ATTRIB',1RY,'PRESENT',7X,'ABSENT')
277 FORMAT(15X,'VOIC1',23X,I2,11X,I2)
278 FORMAT(20X,'FRIC1',16X,I2,11X,I2)
279 FORMAT(20X,'INUN-FRIC1',12X,I2,11X,I2)
280 FORMAT(15X,'NASAL1',22X,I2,11X,I2)
281 FORMAT(20X,'GRAVE1',21X,I2,11X,I2)
282 FORMAT(20X,'ACUTE1',21X,I2,11X,I2)
283 FORMAT(15X,'SUSTEN1',20X,I2,11X,I2)
284 FORMAT(20X,'VOICED1',20X,I2,11X,I2)
285 FORMAT(20X,'UNVOICED1',18X,I2,11X,I2)
286 FORMAT(15X,'STBIL1',20X,I2,11X,I2)
287 FORMAT(15X,'GRAVENESS1',21X,I2,11X,I2)
288 FORMAT(15X,'COMPACTNESS1',19X,I2,11X,I2)
400 FORMAT(' DRT MEANS AND STANDARD ERRORS FOR I,IS, LISTENERS')
401 FORMAT(' SYSTEM INDEX TEST: 1.50A1')
402 FORMAT(' NUMBER OF SPEAKERS = I,I2)
423 FORMAT(// MAIN ATTRIBUT1',12X,'PRESENT',18X,'ABSENT',
      1,12X,'TOTAL')
404 FORMAT(20X,3F4X,'MEAN   S.E. 1')
400 FORMAT(10X,1*****1
      1 30X,' MEAN = I,FR,2,' 1
      1 13X,'TOTAL DRT SCORE = I,15X,1
      1 30X,' S.E. = I,FR,2,' 1
      1 30X,1*****1)
END
C
C
C
C
C

```

#### SUBROUTINE STATS(N,XMEAN,STDERR)

```

COMMON/A/TDSYS,TSYS(501),NAME(15),NPAGE(7,2,31),
XMSPK(15,9),MKEY,LETTER,LIST,TSPK,NUML,NUMS,ARRAY(60),IRESP(2,29),
XDATA(12,5,36)
X=0.0
XN = FLOAT(N)
DO 1 I=1,N
  X = X + ARRAY(I)
CONTINUE
1 XMEAN = X/XN
STDERR = 0.0
DO 2 I=1,N
  2 STDERR = STDERR + (ARRAY(I)-XMEAN)*(ARRAY(I)-XMEAN)
STDERR = SQRT(STDERR/XN/XN)
RETURN
END
SUBROUTINE OUT(N,X)
DIMENSION Y(6)
IF(N.EQ.36)GOTO 19
K=(N+1)/2

```

```

1      IF(K.EQ.11)K=8
2      IF(K.EQ.14)K=8
3      IF(K.EQ.17)K=8
4      IF(K.EQ.12)K=9
5      IF(K.EQ.15)K=9
6      IF(K.EQ.18)K=9
7      IF(K.EQ.13)K=11
8      IF(K.EQ.16)K=12
9      GOTO(1,2,3,4,5,6,7,8,9,10,13,16),K
10     WRITE(6,405)(X(I),I=1,6)
11     RETURN
12     WRITE(6,406)(X(I),I=1,6)
13     RETURN
14     WRITE(6,407)(X(I),I=1,6)
15     RETURN
16     WRITE(6,408)(X(I),I=1,6)
17     RETURN
18     WRITE(6,409)(X(I),I=1,6)
19     RETURN
20     WRITE(6,410)(X(I),I=1,6)
21     RETURN
22     WRITE(6,411)(X(I),I=1,6)
23     RETURN
24     WRITE(6,412)(X(I),I=1,6)
25     RETURN
26     WRITE(6,413)(X(I),I=1,6)
27     RETURN
28     WRITE(6,414)(X(I),I=1,6)
29     RETURN
30     WRITE(6,415)(X(I),I=1,6)
31     RETURN
32     WRITE(6,416)(X(I),I=1,6)
33     RETURN
34     WRITE(6,417)(X(I),I=1,6)
35     RETURN
36     FORMAT(3X,'VOCALICING'),0X,3(3X,F6.2,2X,F6.2))
37     FORMAT(6X,'FRICITIONAL'),4X,3(3X,F6.2,2X,F6.2))
38     FORMAT(6X,'NON-FRICITIONAL'),3(3X,F6.2,2X,F6.2))
39     FORMAT(3X,'INASALITY'),8X,3(3X,F6.2,2X,F6.2))
40     FORMAT(6X,'GRAVE'),9X,3(3X,F6.2,2X,F6.2))
41     FORMAT(6X,'ACUTE'),9X,3(3X,F6.2,2X,F6.2))
42     FORMAT(3X,'SUSTENATION'),6X,3(3X,F6.2,2X,F6.2))
43     FORMAT(8X,'VOICED'),8X,3(3X,F6.2,2X,F6.2))
44     FORMAT(6X,'UNVOICED'),6X,3(3X,F6.2,2X,F6.2))
45     FORMAT(3X,'STRITULATION'),6X,3(3X,F6.2,2X,F6.2))
46     FORMAT(3X,'GRAVENESS'),7X,3(3X,F6.2,2X,F6.2))
47     FORMAT(3X,'COMPACTNESS'),5X,3(3X,F6.2,2X,F6.2))
48     FORMAT(3X,'TOTALS'),10X,3(3X,F6.2,2X,F6.2))
49     END
50     SUBROUTINE MATR
51     COMMON/A/IDSYS,ISYS(50),NAME(15),NPAGE(7,2,3),
52     X4SPK(15,9),MKEY,LETTER,LIST,ISPK,NUML,NUMS,ARHAY(60),IRESP(2,29),
53     XDATA(12,6,36)
54     DIMENSION XMATR(15,6),ITALK(9),ANS(2,6)
55     DIMENSION DEV(15,6),VAR(15),YLM(15),SM(6),ESTAT(15)
56     DIMENSION NMEL(6)
57     DATA TBLNK/2H/
C
58     KKK=4
59     NUMF=0
C
60     DO 200 I=1,NUML
61     DO 200 K=1,NUMS

```

```

      SUM=0.
      DO 202 II=1,31,4
      JJ=II+1
  202  SUM=SUM+DATA(I,K,II)+DATA(I,K,JJ)
      SUM=SUM/12.
      XMATR(I,K)=SUM
C
  312  CONTINUE
      DO 2002 JJJ=1,KKK
      DO 203 I=1,9
  203  ITALK(I)=IBLNK
      DO 204 I=1,NUMS
  204  ITALK(I)=MSPK(1,I)

C
      WRITE(6,100)
      WRITE(6,107)ISYS,(ISYS(I),I=1,30),NUML,NUMS
      WRITE(6,103)
      WRITE(6,100)(ITALK(I),I=1,9)
      IF (NUMS.EQ.6)WRITE(6,1001)
      IF (NUMS.EQ.3)WRITE(6,1002)
  1001 FORMAT(1H+,4X,4HMEAN,4X,4HS,E.)
  1002 FORMAT(1H+,2BX,4HMEAN,4X,4HS,E.)
      WRITE(6,102)

C
      DO 201 LIST=1,NUML
      DO 205 ISPK=1,NUMS
  205  ARRAY(ISPK)=XMATR(LIST,ISPK)
      CALL STATS(NUMS,X,S)
  201  WRITE(6,101)NAME(LIST),(XMATR(LIST,ISPK),ISPK=1,NUMS),X,S
      DO 206 ISPK=1,NUMS
      DO 207 LIST=1,NUML
  207  ARRAY(LIST)=XMATR(LIST,ISPK)
      CALL STATS(NUML,X,S)
      ANS(1,ISPK)=X
      ANS(2,ISPK)=S
  208  CONTINUE
      WRITE(6,104)(ANS(1,I),I=1,NUMS)
      WRITE(6,105)(ANS(2,I),I=1,NUMS)
      DO 208 ISPK=1,NUMS
      DO 209 LIST=1,NUML
      K=NUMS*(LIST-1)+ISPK
  209  ARRAY(K)=XMATR(LIST,ISPK)
      NUMT=NUMS*NUML
      CALL STATS(NUMT,X,S)
      WRITE(6,106)X,S
  2002  CONTINUE
      VHIG=0.
      WRITE(6,108)
      WRITE(6,107)ISYS,(ISYS(I),I=1,30),NUML,NUMS
      WRITE(6,109)
  300  FORMAT(//2X,'LISTENER DEVIATIONS FROM SPEAKER MEANS'//)
      WRITE(6,103)
      WRITE(6,100)(ITALK(I),I=1,9)
      IF (NUMS.EQ.6)WRITE(6,1003)
      IF (NUMS.EQ.3)WRITE(6,1004)
  1003  FORMAT(1H+,51X,3HVAR)
  1004  FORMAT(1H+,30X,3HVAR)
      WRITE(6,102)
      XNUMS=NUMS
      XNUML=NUML
      TOTAL=XNUMS*XNUML
      DO 301 J=1,NUMS

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      SUM=0,
      DO 302 I=1,NUML
      SUM=SUM+XMATR(I,J)
      301  SM(J)=SUM/XNUML
      DO 303 I=1,NUML
      SUM=0,
      DO 304 J=1,NUMS
      SUM=SUM+XMATR(I,J)
      303  XLM(I)=SUM/XNUMS
      SUM=0,
      DO 305 I=1,NUML
      SUM=SUM+YLM(I)
      GM=SUM/XNUML
C
      DO 306 I=1,NUML
      DO 307 J=1,NUMS
      DEV(I,J)=XMATR(I,J)-SM(J)
      SS=0,
      DO 308 J=1,NUMS
      SS=SS+DEV(I,J)*DEV(I,J)
      VAR(I)=SS/XNUMS
      IF(VAR(I).LE.VRIG)GO TO 330
      VHTGVAR(I)
      LRIG=I
      330  WRITE(6,101)NAME(I),DEV(I,J),J=1,NUMS1,VAR(I)
C
      CALL UNITE(XMATH,NUML,NUMS,I,F,ESTAT)
C
      306  CONTINUE
C
      KMP=NUML-NUMS+1
      WRITE(6,400)NUMS,KMP
      400  FORMAT(//1 F STATISTIC FOR TESTING EACH LISTENER
      X AS AN OUT-LYER//1 COMPARE WITH F PERCENTAGE POINT
      X WITH DF=1,T3,1 AND 1,IP1/1
      WRITE(6,401)
      401  FORMAT(' LIST.   F'//)
      DO 402 I=1,NUML
      WRITE(6,403)NAME(I),ESTAT(I)
      403  FORMAT(1X,1F8.3)
      402  CONTINUE
      IF(NUML.LE.8)STOP
      NUME=NUMF+1
      NMEL(NUMF)=NAME(LRIG)
      WRITE(6,500)NMEL(I),I=1,NUMF
      500  FORMAT(/1X,'WILL ELIMINATE',I6)
      IF(LRIG,FO,NUML)GO TO 310
      DO 311 I=LRIG,NUML
      IP1=I+1
      NAME(I)=NAME(IP1)
      DO 311 J=1,NUMS
      XMATR(I,J)=XMATR(IP1,J)
      312  NUML=NUML-1
      KKK=1
      GO TO 312
      CCCCCCCCCCCC
      CCCCCCCCCCCC
      CCCCCCCCCC
      100  FORMAT(5X,0(3X,A2,2X))
      101  FORMAT(/1X,I4,1X,11(2X,FS,2)/)
      102  FORMAT(' LIST.')
      103  FORMAT(RX,1SPEAKERS!/)
      104  FORMAT(/1 MEAN!,1X,11(2X,FS,2)/)

```

```

185      FORMAT(/' S.F.,1,1X,1I(2X,FS,2) /)
186      FORMAT(/30X,17F(16,1) /
X30X,16 MEAN = 1,FS,2,1 *1/
X13X,1TOTAL DRT SCORE1 = 1,15X,1*1/
X30X,16 S.E. = 1,FS,2,1 *1/
X30X,17F(16,1) )
187      FORMAT(' SYSTEM 1,I4,3X,3RA2//'
X5X,1NUMBER LISTENERS = 1,I3/
X5X,1NUMBER SPEAKERS = 1,I3//)
188      FORMAT(1H1,1 1)

C
C
END
SUBROUTINE STATS(N,XMEAN,STDERR)
COMMON/A/IDSYS,ISYS(50),NAME(15),NPAGE(7,2,3),
Y4SPK(15,9),MKEY,LETTER,LIST,ISPK,NUMI ,NIMS,ARRAY(60),RESP(2,29),
XDATA(12,8,30)
C
      XN,
XN=FLOAT(N)
DO 1 I=1,N
X=X+ARRAY(I)
1 CONTINUE
XMEAN=X/N
STDERR=X
DO 2 I=1,N
2 STDERR=STDERR+(ARRAY(I)-XMEAN)*(ARRAY(I)-XMEAN)
STDERR=SQR(STDERR/XN/XN)
RETURN
END
C
C
SUBROUTINE OUTLR(DATA,N,IP,IOUT,F,FSTAT)
DIMENSION S(6,6),DATA(15,6),XMFAN(6),TEMP(6),SINV(6,6)
DIMENSION FSTAT(15)
C
      P=IP
      K=N-1
      XK=K
      KMP=K-IP
      KS=IP-(K-K-1)
      XKMP=XMP
      XKS=KSQ
      RATIO=XKMP/XKSQ
      DO 101 I=1,IP
      XMEAN(I)=0.
100
      DO 101 J=1,IP
      DO 101 I=1,N
      IF(I.EQ.IOUT)GO TO 101
      XMEAN(I)=XMEAN(J)+DATA(I,J)
101  CONTINUE
      DO 102 J=1,IP
      102 XMEAN(J)=XMEAN(J)/XK
C
      XK=K+1
C
      DO 103 I=1,IP
      TEMP(I)=0.
      DO 103 J=1,IP
103  S(I,J)=0.
      IJ=0
      DO 104 I=1,N

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      IF(I.EQ.IOUT)GO TO 104
      DO 105 J=1,IP
105      TEMP(J)=DATA(I,J)-XMEAN(J)
      DO 106 J=1,IP
      DO 106 JJ=1,IP
106      S(J,JJ)=S(J,JJ)+TEMP(J)*TEMP(JJ)
104      CONTINUE
      DO 107 I=1,IP
      DO 107 J=1,IP
107      S(I,J)=S(I,J)/XKM
C      CALL INVERS(S,SINV,IP)
C      DO 111 J=1,IP
111      TEMP(J)=DATA(IOUT,J)-XMEAN(J)
C      DO 112 I=1,IP
      DO 112 J=1,IP
112      S=S+TEMP(I)*SINV(I,J)*TEMP(J)
      KMPsK=IP
      FSTAT(IOUT)=RATIO*D
      RETURN
      END
C
C ***** SUBROUTINE INVERSE *****
C
C
      SUBROUTINE INVERS(A,B,N)
      DIMENSION A(6,6),B(6,6)
      EPS=.0001
      DO 6 I=1,N
      DO 5 J=1,N
      IF(I=J)4,3,4
3      B(I,J)=1.0
      GOTO 5
4      R(I,J)=R',0
5      CONTINUE
6      CONTINUE
      DEL=1.0
      DO 45 K=1,N
      IF(K=N)12,30,30
12      IMAX=K
      AMAX=ABS(A(K,K))
      KP1=K+1
      DO 20 I=KP1,N
      DIFF=AMAX-ABS(A(I,K))
      IF(DIFF)15,20,20
15      IMAX=I
      AMAX=ABS(A(I,K))
20      CONTINUE
      IF(IMAX=K)25,30,25
25      DO 29 J=1,N
      ATMP=A(IMAX,J)
      A(IMAX,J)=A(K,J)
      A(K,J)=ATMP
      RTMP=R(IMAX,J)
      R(IMAX,J)=R(K,J)
      R(K,J)=RTMP
      DEL.=DFL
      CONTINUE

```

```

      DIFF=ABS(A(K,K)-EPS)
      IF(DIFF)93,93,35
35    DFL=A(K,K)*NFL
      DIV=A(K,K)
      DO 38 J=1,N
      A(K,J)=A(K,J)/DIV
38    B(K,J)=B(K,J)/DIV
      DO 43 I=1,N
      AMULT=A(I,K)
      IF(I=K)39,43,39
39    DO 42 J=1,N
      A(I,J)=A(I,J)-AMULT*A(K,J)
42    B(I,J)=B(I,J)-AMULT*B(K,J)
43    CONTINUE
45    CONTINUE
90    RETURN
93    WRITE(6,113)
113   FORMAT(/'* SINGULAR MATRIX */)
      END 8

```

SYSTEM TESTED: 11W4 16-DEC-77 PHASE 1

NUMBER LISTENERS = 11  
NUMBER SPEAKERS = 3

\*\*\*\*\*  
FOR LISTENER: 1277 \*  
\*\*\*\*\*

SPKR SCORE

AV 80.54  
JE 80.58  
RU 83.75

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MATH ATTRIBUTE	PRESENT		ABSENT		TOTAL	
	MEAN	S.E.	MEAN	S.E.	MEAN	S.E.
VOICING	100.00	0.00	87.50	5.89	93.75	2.95
FRICITIONAL	100.00	0.00	83.33	6.89	91.67	3.40
NON-FRICITIONAL	100.00	0.00	91.67	6.89	95.83	3.40
NASALITY	95.83	3.40	100.00	0.00	97.92	1.70
GRAVE	100.00	0.00	100.00	0.00	100.00	0.00
ACUTE	91.67	6.89	100.00	0.00	95.83	3.40
SUSTENTION	83.33	6.89	58.33	3.40	79.83	4.50
VOICED	75.00	11.70	50.00	20.41	62.50	11.79
UNVOICED	91.67	6.89	66.67	13.61	79.17	3.40
SIBILATION	95.83	3.40	100.00	0.00	97.92	1.70
VOICED	100.00	0.00	100.00	0.00	100.00	0.00
UNVOICED	91.67	6.89	100.00	0.00	95.83	3.40
GRAVENESS	91.67	3.40	79.17	9.00	85.42	3.40
VOICED	100.00	0.00	100.00	0.00	100.00	0.00
UNVOICED	83.33	6.89	58.33	16.00	79.83	6.89
COMPACTNESS	100.00	0.00	100.00	0.00	100.00	0.00
VOICED	100.00	0.00	100.00	0.00	100.00	0.00
UNVOICED	100.00	0.00	100.00	0.00	100.00	0.00
TOTALS	94.44	2.27	87.50	0.00	90.97	1.13

\*\*\*\*\*  
\* MEAN = 90.97 \*  
TOTAL DRT SCORE = \*  
\* S.E. = 1.13 \*  
\*\*\*\*\*

SYSTEM TESTED: 1104 16-DEC-77 PROBE 1

NUMBER LISTENERS = 19  
NUMBER SPEAKERS = 3

\*\*\*\*\*  
FOR LISTENERS 3345 \*  
\*\*\*\*\*

SPKR SCORE

BV P8.54  
JE P2.29  
RD P3.75

MAIN ATTRIBUTE	PRESENT		ABSENT		TOTAL	
	MEAN	S.E.	MEAN	S.E.	MEAN	S.E.
VOICING	95.83	3.49	91.87	6.89	93.79	5.19
FRICITIONAL	100.00	0.00	100.00	0.00	100.00	0.00
NON-FRICITIONAL	91.67	6.89	83.33	13.61	87.50	10.21
NASALITY	100.00	0.00	95.83	3.49	97.92	1.79
GRAVE	100.00	0.00	91.67	6.89	95.83	3.49
ACUTE	100.00	0.00	100.00	0.00	100.00	0.00
SUSTENTION	58.33	12.27	75.00	5.89	68.87	8.51
VOICED	58.00	11.79	75.00	11.79	62.50	10.21
UNVOICED	68.67	18.00	75.00	11.79	70.83	6.89
SIBILATION	70.17	9.09	100.00	0.00	89.58	4.58
VOICED	75.00	11.79	100.00	0.00	87.50	5.89
UNVOICED	63.33	13.81	100.00	0.00	91.67	6.89
GRAVENESS	91.67	3.49	70.83	3.49	81.25	2.95
VOICED	100.00	0.00	100.00	0.00	100.00	0.00
UNVOICED	83.33	6.89	41.67	6.89	62.50	5.89
COMPACTNESS	100.00	0.00	100.00	0.00	100.00	0.00
VOICED	100.00	0.00	100.00	0.00	100.00	0.00
UNVOICED	100.00	0.00	100.00	0.00	100.00	0.00
TOTALS	87.50	3.93	88.89	1.99	88.19	2.79

\*\*\*\*\*  
\* MEAN = 88.19 \*

\* TOTAL DRT SCORE = \*

\* S.E. = 2.79 \*

\*\*\*\*\*

SYSTEM TESTED: 1194 16-DEC-77 FROAF 1

NUMBER LISTENERS = 13  
NUMBER SPEAKERS = 3

\*\*\*\*\*  
FOR LISTENER: 4426 \*  
\*\*\*\*\*

SPKR SCORE

BV 88.54  
JE 89.21  
RD 92.71

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MAIN ATTRIBUTE	PRESENT		ABSENT		TOTAL	
	MEAN	S.E.	MEAN	S.E.	MEAN	S.E.
VOICING	100.00	0.00	91.67	6.00	95.83	3.40
FRICITIONAL	100.00	0.00	91.67	6.00	95.83	3.40
NON-FRICITIONAL	100.00	0.00	91.67	6.00	95.83	3.40
NASALITY	100.00	0.00	100.00	0.00	100.00	0.00
GRAVE	100.00	0.00	100.00	0.00	100.00	0.00
ACUTE	100.00	0.00	100.00	0.00	100.00	0.00
SUSTENATION	88.33	9.00	62.50	5.00	80.42	7.41
VOICED	80.00	20.41	41.67	18.00	45.83	14.83
UNVOICED	66.67	13.51	23.33	13.61	75.00	9.00
SIBILATION	66.67	12.22	100.00	0.00	83.33	6.13
VOICED	83.33	6.00	100.00	0.00	91.67	3.40
UNVOICED	50.00	20.41	100.00	0.00	75.00	10.21
GRAVENESS	91.67	6.00	70.17	3.40	85.42	1.70
VOICED	100.00	0.00	100.00	0.00	100.00	0.00
UNVOICED	93.33	13.51	58.33	6.00	70.00	3.40
COMPACTNESS	95.83	3.40	100.00	0.00	97.92	1.70
VOICED	100.00	0.00	100.00	0.00	100.00	0.00
UNVOICED	91.67	6.00	100.00	0.00	95.83	3.40
TOTALS	85.42	4.50	88.89	1.50	87.15	3.00

\*\*\*\*\*  
\* MEAN = 87.15 \*  
\* TOTAL DRT SCORE: \*  
\* S.E. = 3.00 \*  
\*\*\*\*\*

SYSTEM TESTED: 1104 16-DEC-77 PROBE 1

NUMBER LISTENERS = 11  
NUMBER SPEAKERS = 3

\*\*\*\*\*  
FOR LISTENER 5345 \*  
\*\*\*\*\*

SPKR SCORE

BV 87.50  
JE 84.37  
RD 84.70

MAIN ATTRIBUTE:

	PRESENT		ABSENT		TOTAL	
	MEAN	S.E.	MEAN	S.E.	MEAN	S.E.
VOICING	100.00	0.00	91.67	6.89	95.83	3.48
FRICITIONAL	100.00	0.00	91.67	6.89	95.83	3.48
NON-FRICITIONAL	100.00	0.00	91.67	6.89	95.83	3.48
NASALITY	100.00	0.00	100.00	0.00	100.00	0.00
CRAYE	100.00	0.00	100.00	0.00	100.00	0.00
ACUTE	100.00	0.00	100.00	0.00	100.00	0.00
SUSTENTION	75.00	5.80	68.67	9.00	78.83	6.88
VOICED	86.67	13.81	58.33	18.00	82.50	15.59
UNVOICED	83.33	6.00	75.00	11.79	79.17	3.40
SIBILATION	87.50	0.00	100.00	0.00	93.75	0.00
VOICED	83.33	6.89	100.00	0.00	91.67	3.48
UNVOICED	91.67	6.00	100.00	0.00	95.83	3.48
GRAVENESS	86.67	9.00	70.17	3.48	72.92	6.13
VOICED	100.00	0.00	100.00	0.00	100.00	0.00
UNVOICED	83.33	18.00	58.33	6.89	45.83	12.27
COMPACTNESS	100.00	0.00	100.00	0.00	100.00	0.00
VOICED	100.00	0.00	100.00	0.00	100.00	0.00
UNVOICED	100.00	0.00	100.00	0.00	100.00	0.00
TOTALS	88.10	2.47	89.58	2.80	88.89	2.52

\*\*\*\*\*  
\* MEAN = 88.89 \*  
TOTAL DRT SCORE: \*  
\* S.E. = 2.52 \*  
\*\*\*\*\*

SYSTEM TESTED: 1104 16-DEC-77 PROBE 1

NUMBER LISTENERS = 11  
NUMBER SPEAKERS = 3

\*\*\*\*\*  
FOR LISTENER 5406 \*  
\*\*\*\*\*

SPKR SCORE

RV 86.46  
JE 88.54  
RD 88.62

CHARACTERISTICS  
FROM COPY PUBLISHED IN 1971

MAIN ATTRIBUTE	PRESENT		ABSENT		TOTAL	
	MEAN	S.E.	MEAN	S.E.	MEAN	S.E.
VUICING	100.00	0.00	83.33	0.00	91.67	4.50
FRICTIONAL	100.00	0.00	83.33	0.00	91.67	3.40
NON-FRICTIONAL	100.00	0.00	83.33	13.61	91.67	6.80
NASALITY	100.00	0.00	100.00	0.00	100.00	0.00
GRAVE	100.00	0.00	100.00	0.00	100.00	0.00
ACUTE	100.00	0.00	100.00	0.00	100.00	0.00
SUSTENTION	79.17	9.00	58.33	6.00	68.75	2.95
VOICED	86.67	13.61	58.00	0.00	58.33	6.80
UNVOICED	91.67	6.80	58.67	13.61	79.17	3.40
SIBILATION	95.83	3.40	100.00	0.00	97.92	1.70
VOICED	100.00	0.00	100.00	0.00	100.00	0.00
UNVOICED	93.67	6.80	100.00	0.00	95.83	3.40
GRAVENESS	66.67	3.40	79.17	9.00	72.92	6.13
VOICED	93.67	6.80	100.00	0.00	95.83	3.40
UNVOICED	41.67	6.80	58.33	18.00	58.00	11.70
COMPACTNESS	100.00	0.00	100.00	0.00	100.00	0.00
VOICED	100.00	0.00	100.00	0.00	100.00	0.00
UNVOICED	100.00	0.00	100.00	0.00	100.00	0.00
TOTALS	97.28	1.50	88.81	1.00	88.54	0.98

\*\*\*\*\*  
\* MEAN = 88.54 \*  
TOTAL DRT SCORES \*  
\* S.E. = 0.98 \*  
\*\*\*\*\*

## SYSTEM TESTED 1134 16-DFC-77 PROFILE 1

NUMBER LISTENERS = 11  
 NUMBER SPEAKERS = 3

\*\*\*\*\*  
 FOR LISTENER: RUEA \*  
 \*\*\*\*\*

## SPKR SCORE

RV 89.58  
 JE 87.54  
 RU 85.83

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MATH ATTRIBUTE:	PRESENT		ABSENT		TOTAL	
	MEAN	S.E.	MEAN	S.E.	MEAN	S.E.
VOICING	100.00	0.00	95.83	3.40	97.92	1.70
	100.00	0.00	91.67	6.80	95.83	3.40
	100.00	0.00	100.00	0.00	100.00	0.00
NASALITY	104.00	0.00	95.83	3.40	97.92	1.70
	100.00	0.00	91.67	6.80	95.83	3.40
	100.00	0.00	100.00	0.00	100.00	0.00
SUSTENTION	79.17	0.00	70.83	3.40	75.00	5.00
	84.33	1.00	75.00	11.70	86.67	13.61
	100.00	0.00	66.67	13.61	83.33	6.00
SIBILATION	87.50	5.00	100.00	0.00	93.75	2.95
	91.67	6.80	100.00	0.00	95.83	3.40
	93.33	13.61	100.00	0.00	91.67	6.00
GRAVENESS	91.67	6.80	70.83	3.40	81.25	2.95
	91.67	6.80	100.00	0.00	95.83	3.40
	91.67	6.80	41.67	6.80	88.67	3.40
COMPACTNESS	100.00	0.00	100.00	0.00	100.00	0.00
	100.00	0.00	100.00	0.00	100.00	0.00
	100.00	0.00	100.00	0.00	100.00	0.00
TOTALS	93.06	3.04	88.80	1.13	90.97	2.04

\*\*\*\*\*  
 \* MEAN = 90.97 \*  
 \* S.E. = 2.04 \*  
 \*\*\*\*\*

SYSTEM TESTED: 11/14 1A-DFC-77 PROOF 1

NUMBER LISTENERS = 11  
NUMBER SPEAKERS = 3

\*\*\*\*\*  
FOR LISTENER: RHE4 \*  
\*\*\*\*\*

SPKR SCORE

AV 88.54  
JE 88.21  
RD 92.71

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MAIN ATTRIBUTE:	PRESENT		ABSENT		TOTAL	
	MEAN	S.E.	MEAN	S.E.	MEAN	S.E.
VOCALIZING	91.67	6.88	83.33	6.88	87.50	6.88
FRICITIONAL	91.67	6.88	66.67	13.81	79.17	3.48
NON-FRICITIONAL	91.67	6.88	100.00	0.00	95.83	3.48
NASALITY	100.00	0.00	100.00	0.00	100.00	0.00
GRAVE	100.00	0.00	100.00	0.00	100.00	0.00
ACUTE	100.00	0.00	100.00	0.00	100.00	0.00
SUSTENATION	75.00	15.88	54.17	14.83	64.50	14.83
VOICED	75.00	11.70	33.33	24.53	54.17	18.88
UNVOICED	75.00	24.41	75.00	11.70	75.00	11.70
SIBILATION	61.67	3.48	100.00	0.00	95.83	1.70
VOICED	91.67	6.88	100.00	0.00	95.83	3.48
UNVOICED	91.67	6.88	100.00	0.00	94.17	3.48
GRAVENESS	75.00	5.80	79.17	6.88	77.00	1.70
VOICED	100.00	0.00	100.00	0.00	100.00	0.00
UNVOICED	50.00	11.70	58.33	13.81	54.17	3.48
CONTRACTNESS	100.00	0.00	94.17	3.48	97.00	1.70
VOICED	100.00	0.00	100.00	0.00	100.00	0.00
UNVOICED	100.00	0.00	91.67	6.88	95.83	3.48
TOTALS	89.80	5.00	85.42	6.08	87.15	3.00

\*\*\*\*\*  
\* MEAN = 87.15 \*  
\* S.E. = 3.00 \*  
\*\*\*\*\*

SYSTEM TESTED: 1194 16-DEC-77 PROBE 1

NUMBER LISTENERS = 11  
NUMBER SPEAKERS = 3

\*\*\*\*\*  
FOR LISTENER: 8066 \*

\*\*\*\*\* \*

SPKR SCORE

AV 91.67  
JE 92.62  
RD 91.67

MAIN ATTRIBUTE:	PRESENT		ABSENT		TOTAL	
	MEAN	S.E.	MEAN	S.E.	MEAN	S.E.
VOICING	100.00	0.00	95.83	3.40	97.92	1.70
FRICITIONAL	100.00	0.00	100.00	0.00	100.00	0.00
NON-FRICITIONAL	100.00	0.00	91.67	6.80	95.83	3.40
NASALITY	100.00	0.00	95.83	3.40	97.92	1.70
GRAVE	100.00	0.00	91.67	6.80	95.83	3.40
ACUTE	100.00	0.00	100.00	0.00	100.00	0.00
SUSTENTION	91.67	3.40	75.00	0.00	83.33	1.70
VOICED	83.33	6.80	83.33	13.61	83.33	9.00
UNVOICED	100.00	0.00	86.67	13.61	83.33	6.80
SIBILATION	79.17	3.40	95.83	3.40	87.50	2.95
VOICED	83.33	6.80	100.00	0.00	91.67	3.40
UNVOICED	75.00	11.70	91.67	6.80	83.33	6.80
GRAVENESS	87.50	5.80	75.00	10.21	81.25	2.95
VOICED	100.00	0.00	100.00	0.00	100.00	0.00
UNVOICED	75.00	11.70	80.00	20.41	82.50	5.80
COMPACTNESS	100.00	0.00	100.00	0.00	100.00	0.00
VOICED	100.00	0.00	100.00	0.00	100.00	0.00
UNVOICED	100.00	0.00	100.00	0.00	100.00	0.00
TOTALS	93.00	1.50	89.50	0.00	91.32	0.28

\*\*\*\*\*

\* MFAN = 91.32 \*

\*\*\*\*\* \*

\* S.E. = 0.28 \*

\*\*\*\*\*

SYSTEM TESTED: 11H4 16-DEC-77 PROBF 1

NUMBER LISTENERS = 11  
NUMBER SPEAKERS = 3

\*\*\*\*\*  
FOR LISTENER: 9339 \*  
\*\*\*\*\*

SPKR SCORE

RV 84.37  
JE 87.50  
RU 97.92

MAIN ATTRIBUTE:	PRESENT		ABSENT		TOTAL	
	MEAN	S.E.	MEAN	S.E.	MEAN	S.E.
VOICING	100.00	0.00	91.67	6.00	95.83	3.40
FRICTIONAL	100.00	0.00	100.00	0.00	100.00	0.00
NON-FRICTIONAL	100.00	0.00	83.33	13.61	91.67	6.00
NASALITY	95.83	3.40	100.00	0.00	97.92	1.70
GRAVE	91.67	6.00	100.00	0.00	95.83	3.40
ACUTE	100.00	0.00	100.00	0.00	100.00	0.00
SUSTENTION	75.00	11.70	66.67	13.61	79.83	12.27
VOICED	75.00	11.70	50.00	23.57	62.50	15.50
UNVOICED	75.00	11.70	83.33	13.61	79.17	12.27
SIBILATION	95.83	3.40	100.00	0.00	97.92	1.70
VOICED	91.67	6.00	100.00	0.00	95.83	3.40
UNVOICED	100.00	0.00	100.00	0.00	100.00	0.00
GRAVENESS	79.17	9.00	75.00	5.00	77.00	4.50
VOICED	100.00	0.00	100.00	0.00	100.00	0.00
UNVOICED	58.33	18.00	50.00	11.70	54.17	9.00
COMPACTNESS	100.00	0.00	100.00	0.00	100.00	0.00
VOICED	100.00	0.00	100.00	0.00	100.00	0.00
UNVOICED	100.00	0.00	100.00	0.00	100.00	0.00
TOTALS	96.97	3.07	88.80	2.84	90.93	3.34

\*\*\*\*\*  
\* MEAN = 90.93 \*  
TOTAL DRT SCORES \*  
\* S.E. = 3.34 \*  
\*\*\*\*\*

SYSTEM TESTED: 1104 1K-DFC-77 PROBE 1

NUMBER LISTENERS = 11  
NUMBER SPEAKERS = 3

\*\*\*\*\*  
FOR LISTENER: 0463 \*  
\*\*\*\*\*

SPKR SCORE

AV 91.67  
JE 90.62  
RU 92.62

MAIN ATTRIBUTE	PRESENT		ABSENT		TOTAL	
	MEAN	S.E.	MEAN	S.E.	MEAN	S.E.
VOICING	95.83	3.40	95.83	3.40	95.83	1.70
FRictional	100.00	0.00	91.67	6.80	95.83	3.40
NON-FRictional	91.67	6.80	100.00	0.00	95.83	3.40
NASALITY	100.00	0.00	100.00	0.00	100.00	0.00
GRAVE	100.00	0.00	100.00	0.00	100.00	0.00
ACUTE	100.00	0.00	100.00	0.00	100.00	0.00
SUSTENTION	75.00	13.21	79.17	3.40	77.08	4.50
VOICED	66.67	18.00	75.00	11.79	70.00	6.88
UNVOICED	83.33	13.61	83.33	6.80	83.33	3.40
SIBILATION	95.83	3.40	95.83	3.40	95.83	1.70
VOICED	100.00	0.00	91.67	6.80	95.83	3.40
UNVOICED	91.67	6.80	100.00	0.00	95.83	3.40
GRAVENESS	79.17	3.40	75.00	5.89	77.08	4.50
VOICED	100.00	0.00	100.00	0.00	100.00	0.00
UNVOICED	58.33	6.80	50.00	11.79	54.17	9.00
COMPACTNESS	100.00	0.00	100.00	0.00	100.00	0.00
VOICED	100.00	0.00	100.00	0.00	100.00	0.00
UNVOICED	100.00	0.00	100.00	0.00	100.00	0.00
TOTALS	98.97	2.94	98.97	2.27	98.97	0.28

\*\*\*\*\*  
\* MEAN = 98.97 \*  
TOTAL DRT SCORE: \*  
\* S.E. = 0.28 \*  
\*\*\*\*\*

SYSTEM TESTED: 11W4 16-DEC-77 PHASE 1

NUMBER LISTENERS = 11  
NUMBER SPEAKERS = 3

\*\*\*\*\*  
FOR LISTENER: 9557 \*  
\*\*\*\*\*

SPKR SCORE

HV 89.58  
JE 89.58  
RD 92.71

MAIN ATTRIBUTE:	PRESENT		ABSENT		TOTAL	
	MEAN	S.E.	MEAN	S.E.	MEAN	S.E.
VOICING	100.00	0.00	83.33	3.49	91.67	1.70
FRICITIONAL	100.00	0.00	83.33	0.89	91.67	3.40
NON-FRICITIONAL	100.00	0.00	83.33	0.89	91.67	3.40
NASALITY	100.00	0.00	100.00	0.00	100.00	0.00
GRAVF	100.00	0.00	100.00	0.00	100.00	0.00
ACUTE	100.00	0.00	100.00	0.00	100.00	0.00
SUSTENTION	79.17	3.49	68.67	3.49	72.92	6.13
VOICED	58.33	18.00	48.33	13.61	58.33	14.83
UNVOICED	100.00	0.00	75.00	11.79	87.50	5.89
SIBILATION	91.67	3.49	100.00	0.00	95.83	1.70
VOICED	91.67	6.89	100.00	0.00	95.83	3.40
UNVOICED	91.67	6.89	100.00	0.00	95.83	3.40
GRAVENESS	79.17	3.49	87.50	5.89	83.33	1.70
VOICED	91.67	6.89	100.00	0.00	95.83	3.40
UNVOICED	66.67	13.61	75.00	11.79	70.83	3.40
COMPACTNESS	100.00	0.00	100.00	0.00	100.00	0.00
VOICED	100.00	0.00	100.00	0.00	100.00	0.00
UNVOICED	100.00	0.00	100.00	0.00	100.00	0.00
TOTALS	91.67	2.69	89.58	0.98	90.62	0.85

\*\*\*\*\*  
\* MEAN = 90.62 \*  
TOTAL DRT SCORES: \*  
\* S.E. = 0.85 \*  
\*\*\*\*\*

SYSTEM TESTED: 1194 16-DEC-77 PROBE 1

NUMBER LISTENERS = 11  
NUMBER SPEAKERS = 3

\*\*\*\*\*  
FOR SPEAKER: JE \*  
\*\*\*\*\*

LISTENER SCORE

1277	89.58
3345	82.20
4026	88.21
5345	84.37
5496	88.54
6004	87.50
6854	88.21
8056	84.62
9379	87.50
9463	89.62
9557	89.58

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FROM COPY FURNISHED TO DDC

MATH ATTRIBUTE	PRESENT		ABSENT		TOTAL	
	M.EAN	S.E.	M.EAN	S.E.	M.EAN	S.E.
VOICING	85.45	2.42	81.82	3.36	86.64	1.35
FRICITIONAL	97.73	2.17	88.64	3.75	93.18	1.88
NON-FRICITIONAL	93.18	3.36	75.00	5.57	84.99	2.63
NASALITY	100.00	0.00	98.59	1.58	98.30	0.84
GRAVE	100.00	0.00	93.18	3.36	98.59	1.68
ACUTE	100.00	0.00	100.00	0.00	100.00	0.00
SUSTENTION	81.36	4.94	81.36	4.67	81.36	4.00
VOICED	94.55	5.40	25.00	7.87	39.77	5.04
UNVOICED	68.18	7.03	97.73	2.17	82.95	4.62
SIBILATION	79.55	4.80	100.00	0.00	89.77	2.45
VOICED	93.18	3.36	100.00	0.00	96.59	1.68
UNVOICED	65.91	8.05	100.00	0.00	82.95	4.02
GRAVENESS	73.88	3.30	88.84	2.09	81.25	2.54
VOICED	97.73	2.17	100.00	0.00	98.86	1.08
UNVOICED	90.00	7.10	77.27	5.97	83.64	4.94
COMPACTNESS	100.00	0.00	98.86	1.08	99.43	0.54
VOICED	100.00	0.00	100.00	0.00	100.00	0.00
UNVOICED	100.00	0.00	97.73	2.17	98.86	1.08
TOTALS	85.24	1.60	87.88	0.98	86.46	1.15

\*\*\*\*\*  
\* M.EAN = 86.46 \*  
TOTAL DAT SCORE: \*  
\* S.E. = 1.15 \*  
\*\*\*\*\*

SYSTEM TESTED 1104 18-DEC-77 PROBE 1

NUMBER LISTENERS = 11  
NUMBER SPEAKERS = 3

\*\*\*\*\*  
FOR SPEAKER: BV \*  
\*\*\*\*\*

LISTENER	SCORE
1277	89.58
3345	88.54
4026	88.54
5345	87.50
5406	86.46
6004	89.58
6854	88.54
8166	91.57
9339	84.37
9463	91.57
9557	89.58

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FROM COPY FURNISHED TO DDC

MAIN ATTRIBUTE	PRESENT		ABSENT		TOTAL	
	MEAN	S.E.	MEAN	S.E.	MEAN	S.E.
VOICING	100.00	0.00	94.32	2.47	97.16	1.24
	100.00	0.00	88.84	4.94	94.32	2.47
	100.00	0.00	100.00	0.00	100.00	0.00
FRICITIONAL	97.73	1.45	100.00	0.00	98.86	0.73
	97.73	2.17	100.00	0.00	98.86	1.00
	97.73	2.17	100.00	0.00	98.86	1.00
NON-FRICITIONAL	69.32	3.72	81.36	3.39	85.34	2.46
	45.45	5.48	70.45	5.48	57.95	3.32
	93.18	4.65	52.27	2.17	72.73	2.70
SUSTENTION	88.64	2.52	100.00	0.00	94.32	1.26
	79.55	4.33	100.00	0.00	89.77	2.17
	97.73	2.17	100.00	0.00	98.86	1.00
VOICED	81.82	4.05	72.73	2.70	77.27	2.31
	100.00	0.00	100.00	0.00	100.00	0.00
	83.54	8.11	43.45	5.48	54.55	4.62
UNVOICED	98.86	1.00	100.00	0.00	99.43	0.54
	100.00	0.00	100.00	0.00	100.00	0.00
	97.73	2.17	100.00	0.00	98.86	1.00
SIBILATION	88.64	2.52	100.00	0.00	94.32	1.26
	79.55	4.33	100.00	0.00	89.77	2.17
	97.73	2.17	100.00	0.00	98.86	1.00
GRAVENESS	81.82	4.05	72.73	2.70	77.27	2.31
	100.00	0.00	100.00	0.00	100.00	0.00
	83.54	8.11	43.45	5.48	54.55	4.62
VOICED	98.86	1.00	100.00	0.00	99.43	0.54
	100.00	0.00	100.00	0.00	100.00	0.00
	97.73	2.17	100.00	0.00	98.86	1.00
UNVOICED	81.82	4.05	72.73	2.70	77.27	2.31
	100.00	0.00	100.00	0.00	100.00	0.00
	83.54	8.11	43.45	5.48	54.55	4.62
COMPACTNESS	98.86	1.00	100.00	0.00	99.43	0.54
	100.00	0.00	100.00	0.00	100.00	0.00
	97.73	2.17	100.00	0.00	98.86	1.00
TOTALS	89.39	0.82	88.97	0.81	88.73	0.61

\*\*\*\*\*  
\* MEAN = 88.73 \*  
\* S.E. = 0.61 \*  
\*\*\*\*\*

TOTAL DRT SCORE:

SYSTEM TESTED: 1104 16-DFC-77 PROBE 1

NUMBER LISTENERS = 11  
NUMBER SPEAKERS = 3

\*\*\*\*\*  
FOR SPEAKER RD \*  
\*\*\*\*\*

LISTENER	SCORE
1277	93.75
3345	93.75
4025	92.71
5345	94.79
5405	94.62
6894	95.83
6894	92.71
8165	91.67
9339	97.92
9463	90.62
9557	92.71

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MAIN ATTRIBUTE:	PRESENT		ABSENT		TOTAL	
	MEAN	S.E.	MEAN	S.E.	MEAN	S.E.
VOICING	100.00	0.00	94.32	2.05	97.16	1.47
FRICITIONAL	100.00	0.00	90.91	4.85	95.45	2.42
NON-FRICITIONAL	100.00	0.00	97.73	2.17	98.86	1.98
NASALITY	100.00	0.00	100.00	0.00	100.00	0.00
GRAVE	100.00	0.00	100.00	0.00	100.00	0.00
ACUTE	100.00	0.00	100.00	0.00	100.00	0.00
SUSTENTION	95.45	2.42	77.27	3.88	86.38	2.18
VOICED	97.73	2.17	81.82	5.65	89.77	2.70
UNVOICED	93.18	4.65	72.73	5.97	82.95	2.91
SIBILATION	95.45	2.42	97.73	1.45	98.59	1.68
VOICED	97.73	2.17	97.73	2.17	97.73	1.45
UNVOICED	93.18	3.36	97.73	2.17	95.45	2.42
GRAVENESS	89.77	3.83	70.45	2.42	88.11	2.18
VOICED	95.45	2.01	100.00	0.00	97.73	1.45
UNVOICED	84.09	5.81	40.91	4.85	62.50	3.94
COMPACTNESS	100.00	0.00	100.00	0.00	100.00	0.00
VOICED	100.00	0.00	100.00	0.00	100.00	0.00
UNVOICED	100.00	0.00	100.00	0.00	100.00	0.00
TOTALS	95.78	0.73	89.98	1.83	93.37	0.63

\*\*\*\*\*  
\* MEAN = 93.37 \*  
\* TOTAL DRC SCORE = \*  
\* S.E. = 0.63 \*  
\*\*\*\*\*

SYSTEM TESTED: 1104 16-DEC-77 PROBE 1

NUMBER LISTENERS = 11  
NUMBER SPEAKERS = 3

COMBINED RESULTS - STANDARD ERRORS ACROSS SPEAKERS AND LISTENERS \*\*\*\*\*

MAIN ATTRIBUTE:	PRESENT		ABSENT		TOTAL	
	MEAN	S.E.	MEAN	S.E.	MEAN	S.E.
VOICING	98.48	0.89	98.15	1.09	94.32	1.05
FRictional	99.24	0.75	89.39	2.63	94.32	1.32
NON-FRictional	97.73	1.25	90.91	2.80	94.32	1.62
NASALITY	99.24	0.52	98.86	0.63	99.05	0.39
GRAVE	99.24	0.75	97.73	1.25	98.48	0.71
ACUTE	99.24	0.75	100.00	0.00	99.62	0.37
SUSTENTION	75.38	3.37	66.67	2.66	71.82	2.57
VOICED	65.91	4.77	59.09	5.65	62.50	4.22
UNVOICED	84.85	4.00	74.24	3.93	79.55	2.20
SIBILATION	87.88	2.30	90.24	0.52	93.56	1.18
VOICED	90.15	2.38	99.24	0.75	94.70	1.20
UNVOICED	85.61	3.87	99.24	0.75	92.42	2.00
GRAVENESS	81.82	2.40	77.27	2.11	79.55	1.37
VOICED	97.73	1.25	100.00	0.00	98.86	0.63
UNVOICED	65.91	4.77	54.55	4.21	60.23	2.70
COMPACTNESS	99.62	0.37	99.62	0.37	99.62	0.26
VOICED	100.00	0.00	100.00	0.00	100.00	0.00
UNVOICED	99.24	0.75	99.24	0.75	99.24	0.52
TOTALS	99.40	1.06	88.64	0.57	89.52	0.70

\*\*\*\*\*  
\* MFAN = 89.52 \*  
\* TOTAL DRT SCORE: \*  
\* S.E. = 0.70 \*  
\*\*\*\*\*

	BV	JF	RD
MEAN	88.73	86.46	93.37
S.E.	0.61	1.15	0.63

SYSTEM 11W4 16-DEC-77 PROBE 1

NUMBER LISTENERS = 13  
NUMBER SPEAKERS = 3

SPEAKERS

LIST.	BV	JE	RD	MEAN	S.E.
1277	89.58	89.58	93.75	90.97	1.13
3345	88.54	82.29	93.75	88.10	2.70
4026	88.54	88.21	92.71	87.15	3.00
5345	87.50	84.37	94.79	88.80	2.52
5406	86.46	88.54	90.62	88.54	0.98
6004	89.58	87.50	95.83	90.97	2.04
6854	88.54	88.21	92.71	87.15	3.00
8066	91.67	90.62	91.67	91.32	0.28
9339	84.37	87.50	97.92	89.93	3.34
9463	91.67	94.62	90.62	90.97	0.28
9557	89.58	89.58	92.71	90.62	0.85
MEAN	88.73	86.46	93.37		
S.E.	0.61	1.15	0.63		

\*\*\*\*\*  
\* MEAN = 89.52 \*  
TOTAL DRT SCORES \*  
\* S.E. = 0.70 \*  
\*\*\*\*\*

## **Appendix D**

### **Use of Listeners and Behavioral Controls in the In-House Diagnostic Rhyme Test Evaluation**

**Lt. John J. Bowen  
Speech Processing Lab  
Hanscom AFB, Massachusetts  
5 November 1976**

#### **D1. INTRODUCTION**

The purpose of this report is to review the behavioral aspects of handling listeners for an in-house evaluation capability of the Diagnostic Rhyme Test.

The Diagnostic Rhyme Test (DRT) uses a group of trained listeners involved in a speech discrimination task. The test is designed to compare speech intelligibility between voice communication systems; digital voice processors in this case. The comparison is based upon the listeners' reception, recognition, association, and response of the processed stimulus. Since the validity of the DRT depends on human behavioral processes, which are variable from one listener subject to the next, the use of test controls to minimize these individual variables should improve the consistency and reliability of test results.

The test controls covered in this report will include the experimental effects of the test situation. Experimental effects are the sum of variables introduced into

the test situation by the test administrator, the test subjects, and the test environment itself. A brief section on listener selection and preparation will be included also. Continued research is needed in the areas of listener training and performance tracking to improve the control of consistent results. The report will close with conclusions and recommendations on the handling of listeners for in-house DRT evaluations.

## D2. EXPERIMENTAL EFFECTS

As mentioned previously, experimental effects are the summation of all the outside variables contributed by the test administrator, subjects, and environment which contribute to the biasing of the test results. Ideally, a test should measure only those characteristics intended to be measured. Differences among individuals and environments however, can influence and alter test results. If controls can be placed upon the test situation, experimental or test effects can be minimized.

### D2.1 Administrator Effects

From research in experimental design and testing, Rosenthal<sup>1</sup> concludes that a variety of biosocial, psychosocial and social psychological factors which interact between the test administrator and his subjects can effect the subjects' behavior and response. Physical characteristics such as age, sex, race, etc. and personality characteristics such as anxiety, hostility, warmth, dominance, etc. can alter the way a subject responds to the administrator and the test itself. The nature of the DRT however, tends to minimize administrator effects. After the initial training period, the listener subjects know how the test is administered and what the administrator expects of them. When a series of DRTs are being conducted, only one administrator should give the test. It is possible that listener responses could be influenced by a change of test administrators in a test.

The test administrator can influence subjects very easily in the instructions he gives them, according to Rosenthal<sup>1</sup>. He also points out that a test of simple data collection can be biased by the experimenter or administrator.<sup>1</sup> The administrator must be careful not to tell the listeners anything which could influence their responses. Voiers said that the listeners should not be told their test scores or should never be told to try harder on one test than others.<sup>2</sup> Listeners should not be told how many tests are left in a series or how much longer they have until the end of a test. The administrator should never give a subject any doubt that he may fail to be a good listener or that he will be removed from the program if he cannot

1. Rosenthal, R. (1966) Experimental Effects in Behavioral Research, Appleton-Century-Crofts, New York.

2. Interview with W. D. Voiers on 28 Sept 1976 at Dynastat, Austin, Texas.

perform adequately. Any such instructions could influence a listener's motivation or attention and cause inconsistent, and thus, unreliable performance.

The best method to control administrator effects is to develop and use standardized procedures for the administration of the DRT.

#### D2.2 Environmental Effects

Environmental effects are all physical variables present in the test situation which can affect a subject's response. Environmental effects include the comfortability of the test room, temperature, lighting, quietness, distractions, etc. A change in one of these variables can decrease a subject's attention to the task and affect the subject's response.

If the environment is kept constant, the listener will know what to expect and will be able to keep his attention focused on listening. Before the test starts, the administrator should insure that the shades are down in the test room, the partitions between the booths are drawn, distractions are removed from the room, headphones work properly, volume is adjusted comfortably, room temperature is comfortable, and that listeners are supplied with the necessary pens and answer sheets. Voiers<sup>3</sup> says the DRT is insensitive to volume level but he uses an average vowel peak level of 80 db SPL in his tests. Comfortable room temperature for working is between 70 and 74 degrees. Precautions should be taken to insure that all test booklets are complete. Speaker tapes should be introduced and started the same way so the listeners are not taken by surprise when the tape begins. With the presentation of all the tests standardized, the listeners will not have to worry about distractions which would influence their attention and response.

#### D2.3 Subject/Listener Effects

Subject effects can be the most variable of the three effects in a test situation. Personality differences among individuals cause them to respond differently in the test situation. The number of speakers and listeners in the DRT tend to minimize listener effects. Controls on listeners' motivation, attention, and expectancies should increase test reliability although studies have not been performed to support this hypothesis.

Listeners' motivation and attention will be discussed as part of listener effects. Rosenthal<sup>1</sup> proposes that individuals who volunteer for studies have three aims or motives which vary among individuals. These aims will also be discussed in this section regarding their impact on listener effects.

3. Voiers, W. D. (1967) Performance Evaluation of Speech Processing Devices, III. Diagnostic Evaluation of Speech Intelligibility, Final Report, Contract No. AF19(628)4987.

#### D2.4 Motivation

Individuals must be properly motivated to do a task or they will not do it well. Subjects can find both extrinsic and intrinsic motivation in a task like the DRT listener program. Extrinsic motivation includes pay or recognition. For example, letters of appreciation can be sent to the listeners' supervisors. Intrinsic rewards derive from a personal sense of satisfaction, accomplishment, or providing a useful service. Past volunteer listeners have expressed a feeling of high self-satisfaction in participating in the program. Motivation should not be a problem in the in-house DRT program.

#### D2.5 Attention

Span of attention can vary from one listener to the next. Listeners should understand that they should try to pay an equal amount of attention throughout tests. Listeners who try harder on some tests than others will yield inconsistent results.

Attention is largely a variable of time. Swets and Kristofferson<sup>4</sup> point out that there are conflicting opinions as to the decrement of word identification performance vs time. Baker says that the "auditory sense is relatively slow to fatigue".<sup>5</sup>

Woodworth and Schlosberg<sup>6</sup> found that subjects may experience "blocks" in a mental task. Blocks are defined as a person's momentary inability to focus attention. They are involuntary rest periods which delay the onset of fatigue. Rest periods should be used in a test to prevent blocks from occurring since they could cause unwanted variations in test performance.

Voiers uses two groups of listeners and alternates the groups in 20-min work/20 min rest periods for his DRT listeners. He uses 3 to 4-hr sessions.

In-house studies have shown that sets of 20 min work/10 min rest/20 min work periods are most efficient for test with one group of listeners. A minimum of at least 15 min break should be given between these sets.

#### D2.6 Three Aims of Test Subjects

As was mentioned in the introduction of this section of the report, Rosenthal suggests that there are three reasons or aims of people who volunteer for studies or tests.<sup>1</sup> These three aims are related to subject effects upon a test. These aims should be satisfied to minimize the individuals' effects upon the test.

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4. Swets, J. A., and Kristofferson, A. B. (1970) Attention, Annual Review of Psychology, 21:339-366.
  5. Baker, L. M. (1960) General Experimental Psychology, Oxford University Press, New York.
  6. Woodworth, R. J., and Schlosberg, H. (1965) Experimental Psychology revised, Holt, Rinehart and Winston, Inc., New York.

First, test subjects expect to receive a reward for participating in the study. The different types of extrinsic and intrinsic rewards and their effects have been discussed previously under the topic of subject motivation.

Second, test subjects are usually interested in discovering the rationale behind the test. In some studies, the administrator does not want the subjects to know what they are being tested on, so he uses a blind; a false front for the test. Voiers<sup>3</sup> says that familiarity with the DRT does not affect the test. To satisfy the listeners' interest in discovering the rationale of the test, give them a brief explanation of the purpose of the DRT. A summary of voice processors and how the DRT is used to evaluate intelligibility should satisfy the listeners' curiosity and may even develop in them more interest in the program.

The third aim of a subject in a test is to represent himself in a favorable light to the administrator. Subjects are usually curious about their performance. Voiers does not give the test results to his listeners since it could bias later responses. Subjects also try to conform to the expectations of the experimenter, which could lead to biasing through experimenter effects if the administrator is not careful. To solve this problem for the listeners, the administrator should encourage the listeners by recognizing their efforts. He can assure them and show appreciation without giving them the test results. Rosenthal<sup>1</sup> says that a "self-fulfilling prophecy" works on test subjects. If the administrator does not give the listeners any reasons why they would fail as good listeners, and assures them that they are performing well, they should not worry about how they are performing. This, in turn, should minimize any effects due to the listeners doubting their performance.

### D3. LISTENER PREPARATION

This section will briefly discuss some aspects of listener selection and use of listeners in the DRT.

Since the DRT is a speech discrimination task, subjects must pass certain hearing tests before they can become listeners in the program. First, the subject must have normal hearing as determined by an audiometer test. Voiers uses a range of 250 to 8000 Hz.<sup>7</sup> Second, the subject must be able to discriminate between the present and absent states of all six voice attributes. Voiers et al found that hearing impairment is not unidimensional<sup>8</sup> and may go beyond simple tone reception. Different aspects of speech discrimination performance are affected depending on

7. Voiers, W. D. (1969) The Effects of Masking Voices on the Apprehensibility of Six Consonant Attributes, Scientific Report No. I, AFCRL Contract No. AF19(628)-5883.

8. Voiers, W. D., Sharpley, A. D., and Hehmsoth, C. J. (1973) Research on Diagnostic Evaluation of Speech Intelligibility, Final Report, AFCRL Contract No. F19628-70-C-0182.

the degree and nature of the hearing impairment.<sup>8</sup> This aspect of hearing impairment can be determined by checking the performance of trainee listeners over a control DRT tape. Performance in each voice attribute should level out after a period of practice. Erratic performance on any attribute would indicate a hearing impairment in that individual and he should not be used as a listener. Further tests need to be performed in this area however, since it is unknown how long it takes the average listener to find a consistent level of performance in all attributes. Answers to this question would define the training period for new listeners and would discriminate between good and bad listeners.

After a pool of listeners is established and you are ready to test, trained listeners need a warm-up test before each session of DRTs. Voiers says two speaker lists prove enough warm-up to get the listeners reaccustomed to the DRT.<sup>3</sup> In-house tests have supported this finding. The warm-up lists should not be the same lists which are to be evaluated in the test.

During each DRT session, each listener should be tested to make sure he is performing satisfactorily. Responses from a listener who is under emotional stress, tired, etc. during one session will differ from his normal performance. If this occurs, the listeners' results should not be used in that evaluation. Since eight listeners are used in the DRT, ten listeners should be tested to allow for two sets of results to be discarded for the preceding reason. A control tape, played once each session, can be used to track the listeners' performance for that day and compare it to their standard performance. Research is necessary in this area to establish criteria on acceptable performance limits for listeners.

#### D4. CONCLUSIONS AND RECOMMENDATIONS

The DRT is designed so as to minimize experimental effects. The precautions suggested previously in this report, are an aid to insure experimental effects are minimized. The test administrator should be aware of the influence he has on a test, even the DRT. The environment should be kept comfortable and free of changes. After the training period, the listeners should settle into a comfortable understanding and consistency in taking the DRT. Therefore, very little in the way of recommendations on a standard set of instructions can be given to the listeners every time they come to take the test. They will know what their job is. All the administrator need do is remind them to pay consistent attention and how to score the answer sheet. They should become familiarized enough not to require detailed instructions for every session.

There are only two major areas that need refining to better implement the in-house DRT evaluation. The first area involves the discrimination between good

and bad listeners. A good listener is a consistent scorer. An inconsistent listener can not be used in the DRT program. A statistical test to define the limits of consistency has not been developed as of yet. Once criteria have been developed, the bad listeners can be identified and a pool of good listeners can be established for use in the in-house program.

The second area of research involves the tracking of listener performance. Once again, statistical tests have yet to be developed to record the on-going performance of the established listener pool. A statistical test to establish confidence intervals for each individual's performance must be developed to validate each listeners' performance during each DRT.

Once statistical tests to discriminate between consistent and inconsistent listeners and statistical tests to track each individual's performance are developed, the in-house capabilities for the DRT should be sufficient to conduct reliable testing.

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2. Interview with W. D. Voiers on 28 Sept 1976 at Dynastat, Austin, Texas
3. Voiers, W. D. (1967) Performance Evaluation of Speech Processing Devices, III. Diagnostic Evaluation of Speech Intelligibility, Final Report, Contract No. AF19(628)4987.
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